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Public Document No. 104

# The Commonwealth of Massachusetts.

## THIRD ANNUAL REPORT

OF THE

# STATE BOARD OF LABOR AND INDUSTRIES.

JANUARY, 1916.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
32 DERNE STREET.
1916.

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Approved by
The State Board of Publication.

# STATE BOARD OF LABOR AND INDUSTRIES.

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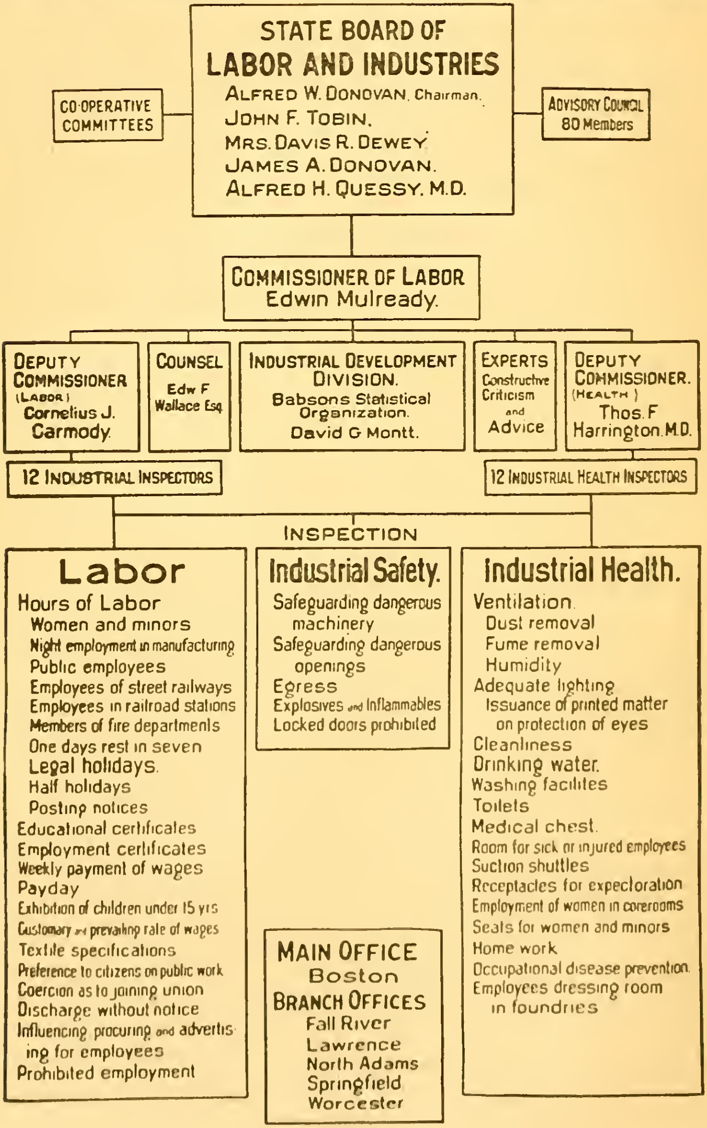
JOHN F. TOBIN.
JAMES A. DONOVAN.
MRS. DAVIS R. DEWEY.
ALFRED H. QUESSY, M.D.

EDWIN MULREADY, *Commissioner of Labor.*

CORNELIUS J. CARMODY, *Deputy Commissioner (Labor).*
THOMAS F. HARRINGTON, M.D., *Deputy Commissioner (Health).*

# THE COMMONWEALTH OF MASSACHUSETTS

## CHART SHOWING ORGANIZATION AND JURISDICTION OF THE STATE BOARD OF LABOR AND INDUSTRIES.



**STATE BOARD OF LABOR AND INDUSTRIES**

Alfred W. Donovan, Chairman.
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James A. Donovan.
Alfred H. Quessy. M.D.

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**DEPUTY COMMISSIONER** (LABOR)
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Babsons Statistical Organization.
David G Montt.

**EXPERTS**
Constructive Criticism and Advice

**DEPUTY COMMISSIONER.** (HEALTH)
Thos. F Harrington. M.D.

12 Industrial Inspectors

12 Industrial Health Inspectors

INSPECTION

### Labor

- Hours of Labor
  - Women and minors
  - Night employment in manufacturing
  - Public employees
  - Employees of street railways
  - Employees in railroad stations
  - Members of fire departments
  - One days rest in seven
  - Legal holidays.
  - Half holidays
  - Posting notices
- Educational certificates
- Employment certificates
- Weekly payment of wages
- Payday
- Exhibition of children under 15 yrs
- Customary and prevailing rate of wages
- Textile specifications
- Preference to citizens on public work
- Coercion as to joining union
- Discharge without notice
- Influencing procuring and advertising for employees
- Prohibited employment

### Industrial Safety.

- Safeguarding dangerous machinery
- Safeguarding dangerous openings
- Egress
- Explosives and Inflammables
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- Ventilation
  - Dust removal
  - Fume removal
  - Humidity
- Adequate lighting
  - Issuance of printed matter on protection of eyes
- Cleanliness
- Drinking water.
- Washing facilites
- Toilets
- Medical chest.
- Room for sick or injured employees
- Suction shuttles
- Receptacles for expectoration
- Employment of women in corerooms
- Seats for women and minors
- Home work
- Occupational disease prevention.
- Employees dressing room in foundries

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Boston

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# The Commonwealth of Massachusetts.

## REPORT OF THE STATE BOARD OF LABOR AND INDUSTRIES.

*To the Honorable Senate and House of Representatives.*

The State Board of Labor and Industries has the honor to submit herewith its third annual report.

Early in the year Prof. Selskar M. Gunn resigned as a member of the Board, and on Aug. 11, 1915, Mr. James A. Donovan of Lawrence was appointed to fill the unexpired term. Dr. A. H. Quessy was reappointed as a member of the Board for a term of five years.

The Board held 49 meetings during the year, with an attendance of 84 per cent. of the members, 12 formal conferences and 18 hearings. In addition there were held 13 meetings of the Joint Board with 2 hearings.

On May 13, 1915, Dr. Thomas F. Harrington was appointed Deputy Commissioner of Labor (Health), and assumed his duties on June 1, 1915. With this exception the executive officers of the department remained as constituted in 1914.

Attention is called to the report of the Commissioner of Labor attached hereto and made a part of this report.

The law creating the State Board of Labor and Industries has very definitely fixed the duties of the Board.

> The board may investigate the conditions existing in any line of industry carried on by inhabitants of the commonwealth, and such investigations may be extended outside of the commonwealth to procure information for the promotion of industrial development or the improvement of industrial conditions. The board shall receive all complaints concerning conditions existing in any industry carried on by inhabitants of the commonwealth, or concerning alleged violations of any laws enforced under its direction, and shall thereupon make or

> direct all needful and appropriate investigations and prosecutions. It may employ experts or other necessary assistants to aid in the performance of any duty imposed upon it by law. It may make rules not inconsistent with existing law for carrying out the provisions of this act.

The Board is also charged with —

> . . . the enforcement of laws relating to labor and the employment thereof, the inspection and licensing of buildings or parts of buildings used for industrial purposes, the inspection and licensing of the workers therein and of all other industrial employees within the commonwealth, the enforcement of laws relating to the employment of women and minors, and the institution of proceedings in prosecution of violations of any of the said laws. . . .

For the proper discharge of these important and varied duties the Board is furnished with an organization perfectly designed to carry on the work, consisting of a Commissioner of Labor, appointed by the Board and directly responsible to it, acting as executive officer; and two deputy commissioners of labor, acting under the direction of, and responsible to, the Commissioner of Labor. One of the deputy commissioners is especially qualified to supervise, under the jurisdiction of the Board, the enforcement of laws which relate to the health of persons employed in buildings used for industrial purposes, and is charged with that duty. There are also 24 inspectors, 5 of whom are women, and clerical assistants necessary to care for the large amount of office work involved in such a department. With this large force acting in harmony the workers of Massachusetts have a right to demand improved industrial conditions, and it is a pleasure for the Board to report that during the past year a great advance has been made in this direction.

## Women and Children in Industry.

The enforcement of laws governing the employment of women and children, the hours of labor and the conditions under which they shall work, is among the most important duties entrusted to this Board. This is shown by the number of orders issued by the department during the past year. Of the 7,096 orders issued, nearly 6,500 were directly affecting the conditions under which women and children work. Law enforcement in these matters is often obstructed by the attitude of certain persons in the community who have yet to be convinced of the importance of these laws.

In a recent decision of the Supreme Court of Illinois the following language is used: —

> It is known to all men (and what we know as men we cannot profess to be ignorant of as judges) that woman's physical structure and the performance of maternal functions place her at a great disadvantage in the battle of life; that while a man can work for more than ten hours a day without injury to himself, a woman, especially when the burdens of motherhood are upon her, cannot; that while a man can work standing upon his feet for more than ten hours a day, day after day, without injury to himself, a woman cannot; and that to require a woman to stand upon her feet for more than ten hours in any one day and perform severe manual labor while thus standing, day after day, has the effect to impair her health; and that as weakly and sickly women cannot be the mothers of vigorous children, it is of the greatest importance to the public that the State take such measures as may be necessary to protect its women from the consequences induced by long, continuous manual labor in those occupations which tend to break them down physically. It would therefore seem obvious that legislation which limits the number of hours which women shall be permitted to work to ten hours in a single day in such employments as are carried on in mechanical establishments, factories and laundries would tend to preserve the health of women and insure the production of vigorous offspring by them, and would directly conduce to the health, morals and general welfare of the public.

At the present time there is an agitation for still shorter hours for women, and it would seem that the effort in this direction should not confine itself to the fixing of a maximum, which might safely be adopted for the majority of women, but rather to fix upon a minimum which would insure to all women the protection of this beneficent law.

Minors under fourteen years of age are forbidden to work during the hours when the public schools are in session, or in certain employments at any time. Those under sixteen years of age may be employed under certain conditions in industries of a varied character. These provisions of law are sometimes a subject for severe criticism.

The first law in Massachusetts relating to the subject of child labor was passed in 1836, and it was many years before the Legislature decided to prevent children from working while the schools were in session. If children of a tender age are allowed to work when the schools are not in session, thus preventing any interference with the education of the child, why should we not concede further to the child the right for hours of recreation and play? In these days when the public funds are expended to build up a system of parks and playgrounds for the use of the children, with the belief on the part of the people that this expenditure is wisely made in behalf of a better and healthier childhood, it seems a bit inconsistent to so arrange the working hours of children that those standing most in need of the playgrounds are surrounded by conditions which prevent their use of these advantages at the only time when they are in a position to use them.

For two years the State Board of Labor and Industries has asked the Legislature to prevent boys from working in private bowling alleys, as the law now forbids them from working in public bowling alleys. Our contention is that there is no difference in the effect on the boy whether the alley is public or private, but thus far the Legislature has refused to adopt our suggestion, and boys are kept employed in private bowling alleys to a very late hour at night, much to the detriment of their school work. If we are to have a change in conditions which control the hours of labor of women and minors it must come through a system of industrial education, and this Board regrets its inability to contribute anything in that direction except by a suggestion in its annual report.

## HOMEWORK.

Attention was called in the second annual report of the Board to the conditions existing in the licensed homework. During the year the report to which reference was made at that time has been distributed, and we trust it may have the effect of shedding some light on this vexed problem, and leading to the passage of some consistent law on the subject.

## INDUSTRIAL DEVELOPMENT.

The Industrial Development Division of this department has been continued with very gratifying results. The arrangement made at the beginning with the Philadelphia Commercial Museum, by which the information accumulated by that organization became available to our Massachusetts manufacturers, was discontinued, and a similar arrangement made with the Babson Statistical Organization at Wellesley, Mass. In our arrangement with this organization there is included the part-time services of a foreign trade expert. Mr. David G. Montt, a native of South America, is at the office of the Board twice each week, and oftener when necessary, to answer all sorts of inquiries from Massachusetts manufacturers. A detailed statement of the work accomplished is contained in another part of this report, and we take great pleasure in calling attention to this new development of State activity. With the end of the present crisis in Europe we believe that this department may well extend its field of usefulness, and become, as it was designed to be, of great assistance to the industries of Massachusetts.

## SUCTION SHUTTLE LAW.

The Board has held a number of hearings during the year looking to the abolition of the suction shuttle and the enforcement of the law relating thereto. These hearings were attended by the cotton manufacturers and by the representatives of those employed in cotton factories. There seemed to be disposition on both sides toward co-operation in solving this problem, the employees insisting on the danger from the use of these appliances and the manufacturers stating, for the purpose of record, that they were willing to adopt any shuttle which could be designed for the manufacture of cloth, and in the use of which it is unnecessary to thread the shuttle by sucking with the mouth. The manufacturers at the present time are experimenting with a number of shuttles in accordance with this suggestion.

## Rest Rooms and Equipment.

By chapter 216 of the General Acts of 1915 the following provision was made: —

> Every person, firm or corporation operating a factory or shop in which machinery is used for any manufacturing or other purpose except for elevators, or for heating or hoisting apparatus, shall at all times keep and maintain, free of expense to the employees, such medical or surgical chest, or both, as shall be required by the state board of labor and industries, and containing plasters, bandages, absorbent cotton, gauze, and all other necessary medicines, instruments and other appliances for the treatment of persons injured or taken ill upon the premises. Every such person, firm or corporation, employing one hundred or more persons, shall, if so required by the state board of labor and industries, provide accommodations, satisfactory to said board, for the treatment of persons injured or taken ill upon the premises. Every person, firm or corporation carrying on a business in a mercantile establishment in which twenty or more women or minors are employed, shall in the manner aforesaid provide such medical and surgical chest as the state board of labor and industries may require. A person, firm or corporation violating any provisions of this section shall be punished by a fine of not less than five dollars nor more than five hundred dollars for every week during which such violation continues.

The Board has made an investigation of the number and character of places already existing for the treatment of persons injured or taken ill upon the premises, and is at present working upon a plan for a standard equipment in such places. This is an instance where the manufacturers have anticipated the law, and the Board acknowledges its satisfaction with the attitude of most of the manufacturers of the State toward the subject.

## Foundry Regulations.

Among the oldest industries of the State is the foundry industry, and for obvious reasons there has been little change in the conditions in most foundries since the beginning of the industry. Instead of issuing special orders for the change of conditions in each individual foundry it was thought better and more just to adopt regulations which should cover foundry conditions generally. As the first step in this direction the Board invited representative manufacturers and their employees to serve on a committee to suggest reasonable rules for foundries. The Board was fortunate in the acceptance of their invitation to serve on this committee of —

Mr. Walter C. Fish, General Electric Company, Lynn.
Mr. R. D. Reed, H. B. Smith Company, Westfield.
Mr. Frank Williams, Crompton-Knowles Company, Worcester.
Mr. Richard E. Warner, White-Warner Company, Taunton.
Mr. John R. O'Leary, Worcester,
Mr. Eugene L. Murphy, Norwood,
Mr. James A. Loveday, Pittsfield,
Mr. William John, Boston,
} International Molders' Union.

The labor of this committee is not yet finished, but several months of very effective work have been devoted to these regulations, and we trust that when the same are issued they may prove to be a model set of rules, endorsed in advance by the manufacturers and the workmen. When these rules are completed they will include the regulations for the employment of women in core rooms.

## Customary and Prevailing Rate of Wages.

The enforcement of the law, chapter 474, Acts of 1914, has made some progress during the past year. The Board has been called upon to decide 14 cases involving the prevailing rate of wages to be paid to mechanics employed in the construction of public works. In one case, that of the commissioners of the city of Lynn, an appeal was taken to the Supreme Court on the question of the constitutionality of the law. The law was upheld. (See Appendix G for decision.)

## Legislative Recommendations.

The law requires the State Board of Labor and Industries to submit to the General Court a report containing the statement of the character and results of the work performed by it or under its direction, together with such recommendations for such additional legislation as the Board shall deem necessary. The policy of the State Board of Labor and Industries has been to work out the different problems without asking for additional legislation, with the conviction that time would demonstrate the strength and the weakness of existing labor laws. However, there are several matters which came to the Board through its experience in the work of enforcement of law, and the Board, therefore, respectfully recommends the following legislation:[1] —

### 1. *Industrial Work in Tenements and Dwelling Houses.*

For some years the law has provided for the inspection and licensing of places in which clothing is manufactured.

We believe that there are other industries carried on in the home which should receive the same attention, particularly those relating to the manufacture of food and articles which are to be used in connection with food.

### 2. *Prohibited Employment of Minors.*

The evil which it was sought to correct by prohibiting minors under sixteen years of age from employment in bowling alleys is made ineffective by the insertion of the word "public," for we find that boys are employed in clubs and other private establishments as late as 11 o'clock at night.

These boys are unable to properly attend to their school work the following day, and we therefore suggest that the word "public" be removed from the law.

We also suggest that the employment of boys and girls as ushers or attendants in theatres and moving-picture houses has grown to be a detriment to the children of the public schools, and we believe that this form of work should be prohibited.

### 3. *Wages of Mechanics employed on Public Works.*

The law at present provides for the punishment of any contractor who knowingly and wilfully violates the provisions of chapter 474 of the Acts of 1914, but does not provide a penalty for the appointive public officer who violates the law. Hence the proposition contained in this bill.

### 4. *The Weekly Payment of Wages.*

The very satisfactory enforcement of this law has led to inquiry as to why hotels should not be included in the establishments where the law may be applied. There seems to be no good reason for this omission, and we therefore respectfully ask for the passage of this amendment.

---

[1] Bills covering these recommendations will be found in Appendix D.

### 5. *Prosecution for Violation of the Weekly Payment of Wages Law.*

Delay in the payment of the wages due an employee in many cases extends over the thirty days allowed by law for making complaint. Unscrupulous employers take advantage of this delay to defeat the purpose of the law.

We therefore ask for the extension of the time in which the complaint may be made to three months.

### 6. *Receptacles for Expectoration.*

One of the health dangers which is called to the attention of the Board is the provision regarding suitable receptacles for expectoration.

There seems to be no uniformity in the factories and workshops of the State. This condition is due to the division in responsibility, which is caused by the provision requiring the receptacles to meet with the approval of the different boards of health.

The enforcement of this very salutary law would be made more effective by the provision suggested in this act.

### 7. *Inspection Force.*

Since the organization of this department it has been recognized that the inspection force was inadequate for the work which was entrusted to it. It is estimated that there are about 50,000 industrial establishments in the State, and but 24 inspectors to cover the work.

By the abolition of the Homework Division (12 investigators), reference to which was made in our last report, the work formerly performed by this division was added to the duties of the inspectors.

In order that all the people of the State may receive the benefit of the present laws it is respectfully recommended that the law be changed to permit the appointment of 36 inspectors instead of 24, as at present.

In conclusion, the State Board of Labor and Industries begs to record its belief that the work entrusted to it has made real progress, and that better conditions for those who labor has been the result. Again we must emphasize our suggestion of last year, that the inspection force is altogether inadequate for the work to be accomplished.

With 50,000 industrial establishments in Massachusetts to be inspected it will be seen that it is positively impossible for 24 inspectors to do the work. The educational work now in contemplation by this Board will ultimately lead in the direction of less inspection force, for our efforts shall be to convince the employers of labor that the instructions which now come to them in the shape of orders should be accepted as suggestions for the improvement of their establishments. In the meantime, however, sufficient force must be maintained to do appropriate pioneer work in this direction.

Respectfully submitted,

STATE BOARD OF LABOR AND INDUSTRIES,

Alfred W. Donovan.
John F. Tobin.
Mrs. Davis R. Dewey.
James A. Donovan.
A. H. Quessy, M.D.

# REPORT OF THE COMMISSIONER OF LABOR.

*To the State Board of Labor and Industries.*

In compliance with your instructions I have the honor to submit herewith my second annual report as Commissioner of Labor.

A statement of the varied activities of the department must necessarily include the matters which have been at some time called to the attention of the Board, as well as those incidental to the duties of the commissioner. To continue our efforts and not pause to look backward would seem easier than to stop to consider at this time the history of our organization. We stop to take account of stock; to find our bearings; to be sure that our good craft is pointed in the right direction, — in a word, to prove by the test of experience that the cause for which we stand is perfectly sound and in the end will prove beneficial to the Commonwealth of Massachusetts.

The call to this work, so soon after its inception, brought its own compensation and its own difficulties as well. It was substantially a pioneer work, not embarrassed with precedents. It remained for the Commissioner of Labor, under the appointment and direction of the State Board of Labor and Industries, to develop a system, under the organization provided by law, which would prove most efficacious in the interest of the individual worker, and this without in any way abridging the rights and privileges of the employer. It was in this spirit that the commissioner undertook the work of this department, and because of the large and varied interests involved our report will contain only a brief outline of the work which has been accomplished during the past year.

## Labor Law Enforcement.

One of the important functions of this department is the enforcement of laws made to protect the worker from the conditions which make for shorter lives, less efficiency and greater dependency; in a word, to make effective the laws which have been made to protect the interests of those who labor. Loading the statute books with laws, however beneficent such laws may be, will never bring about the desired result. On the front of a court house in Massachusetts we read "Obedience to Law is Liberty," but the building upon which we find the inscription stands as a monument to wise and judicious law enforcement. With a full appreciation of the great importance of this function of the department we have approached the subject of law enforcement, not by drastic prosecution of every known violator of the law, but rather by a method designed to teach all the truth of the inscription to which we have referred, — "Obedience to Law is Liberty."

Samuel Gompers, a great leader of men, has said, "Those who contribute to making the law clear, definite and settled, perform a public service, and in the meantime if the clamor and misrepresentation of opponents put them in a false position before the general public they must wait in patience and fortitude until the day when the nation has spoken the last word, either through the highest judicial tribunal, where bias or prejudice or misconception is not to be expected, or through a change by legislation affecting the points at issue."

We have endeavored to enforce the law without recourse to courts and prosecution. We have insisted in a very impersonal manner on the observance of the law because it is the law. We have assumed in every case that the law contained in the statute books was just and proper, but we have not discouraged those who differed with us in their efforts to test the law by a decision from the highest judicial tribunal.

Two very important decisions (see Appendix G), one affecting the "citizens preference act," and the other concerning the position of women workers, have been decided by the Supreme Court of Massachusetts during the past year, both decisions favoring the contention of this department.

This work of law enforcement has been made easy and more effective by the co-operation of many of the most progressive manufacturers in the State. Committees of employers have met with committees representing the workmen, and together, under the direction of the department, studied problems concerned with modern industrial methods, the manufacturer realizing as never before that the greatest asset in his entire establishment is the healthy, energetic, contented workman, and the employee appreciating the value of proper conditions under which to labor.

The real spirit of co-operation was cultivated at these meetings, and through this co-operation will come, in the near future, rules and regulations governing industrial conditions which shall really represent the interests of both sides in industry, — the employer and the employed.

With the inspection of 32,000 establishments and the issuance of 14,000 orders we have found it necessary to prosecute in only 340 cases, which speaks volumes, not only for the method but also for the fair-minded and liberal manner in which we were met by the business men of Massachusetts.

The following summary of the work of our legal department is submitted: —

| | |
|---|---|
| Prosecutions, | 340 |
| Verdicts: — | |
| Guilty, | 329 |
| Not guilty, | 11 |
| Total, | 340 |

| Character of offence: — | |
|---|---|
| Strike on, not stated in advertisement, | 1 |
| False statement of age, | 1 |
| Certificates not on file, | 22 |
| List of minors fourteen to sixteen years of age not posted, | 1 |
| Time notice not posted, | 17 |
| Employed at time other than stated on time notice, | 6 |
| Overtime in industrial establishments, | 48 |
| Employing illiterate minors not attending evening school, | 2 |
| Employing minor on dangerous machinery, | 2 |
| Not providing suitable seats, | 1 |
| Employing noncitizens on public works, | 4 |
| Overtime employment on public works, | 1 |
| Minors under fourteen years of age employed in industrial establishments, | 3 |

| | |
|---|---|
| Minor under sixteen in bowling alley, | 1 |
| Employing minor under sixteen after 6 P.M., | 12 |
| Employing minor under twelve after 10 P.M., | 2 |
| Nonpayment of wages, | 198 |
| Refusal to pay prevailing rate of wages, | 1 |
| Improper ventilation, | 1 |
| Toilet facilities bad, | 2 |
| Not providing hoods for emery wheels, | 1 |
| Not allowing two days of rest in calendar month, | 1 |
| Not allowing twenty-four consecutive hours of rest, | 8 |
| Working on day of rest, | 4 |
| Total, | 340 |

| | |
|---|---|
| Number of nonpayment of wage cases for year ending Dec. 31, 1915, | 896 |
| Number of nonpayment of wage cases adjusted in court, | 198 |
| Number of nonpayment of wage cases adjusted in legal department, | 698 |
| Wages paid by employer after complaint (five months), | $3,192 22 |

## INSPECTION WORK.

During the year inspections have been made of 31,843 establishments, with 10,597 reinspections and 14,003 orders issued. The tabulation of these orders is as follows: —

| | | |
|---|---|---|
| Labor: — | | |
| Limit of hours of labor, | 672 | |
| Posting notices and filing lists, | 3,137 | |
| Sunday employment, | 572 | |
| Procuring and returning school certificates, | 2,624 | |
| Miscellaneous, | 91 | |
| Total, | | 7,096 |
| Industrial health: — | | |
| Ventilation, humidity, dust removal, | 337 | |
| Toilet and washing facilities, | 3,799 | |
| Medical and surgical chests, | 1,679 | |
| Exclusion of minors from dangerous trades, | 53 | |
| Miscellaneous, | 181 | |
| Total, | | 6,049 |

| | | |
|---|---|---|
| Industrial safety: — | | |
| Safeguarding dangerous machinery, | 683 | |
| Safeguarding dangerous openings, | 5 | |
| Egress, | 11 | |
| Miscellaneous, | 159 | |
| Total, | | 858 |
| Grand total of orders issued, | | 14,003 |
| Orders complied with, | | 11,973 |
| Orders pending Dec. 31, 1915, | | 1,924 |
| Orders revoked and placed on file because no violation existed at time of reinspection, and also because some concerns had gone out of business, | | 106 |

With approximately 50,000 industrial establishments in Massachusetts it will be seen that there remains a large number without inspection. This is a most unfortunate condition, and we trust that the Legislature of 1916 may see its way clear to authorize an increased force of inspectors for this department, the present number (24) being entirely inadequate for the work.

## Industrial Development Division.

The Industrial Development Division, which was organized in September, 1914, continued its work of studying industrial conditions and promoting the industrial development of Massachusetts.

During the year 1915 unemployment conditions were somewhat improved in this State. To ascertain the degree of this improvement the Industrial Development Division, with the co-operation of the Massachusetts unemployment committee, carried out a thorough investigation, the results of which are shown in the pamphlet which is to be published by the department in the near future.

Through a co-operative agreement with the Lisbon Association of Commerce and the Russian-American Chamber of Commerce information has been exchanged and assistance mutually rendered to manufacturers in this country and purchasers in other countries, and reliable agencies were secured for several of our manufacturers.

To further the interests of our manufacturers in foreign countries the Industrial Development Division started at the end of the year a classification of foreign merchants who had already done business with the United States manufacturers. These will be circularized during the coming year for the exclusive benefit of Massachusetts manufacturers.

Among the publications of the Board issued during 1915 we might mention: Industrial Bulletin No. 3, entitled "The Financial and Commercial Operations involved in Foreign Trade;" Bulletin No. 4, the report of Roger W. Babson, special representative of the State Board of Labor and Industries on business opportunities in Latin America, entitled "South America and Massachusetts;" and "The Labor Exchange of England," by Mr. John S. Lawrence. These pamphlets have been widely distributed all over the State, and have brought from our manufacturers and merchants very encouraging comments on their value.

The following tabulation shows the extent of this part of our work: —

| | | | |
|---|---|---|---|
| "Trade Opportunities" sent out to Massachusetts manufacturers directly interested, | | | 1,111 |
| Number of concerns to whom "Trade Opportunities" were sent, | | | 17,198 |
| Character of opportunities: — | | | |
| Domestic, | | 606 | |
| Foreign, | | 505 | |
| Albania, | 1 | | |
| Argentina, | 14 | | |
| Australia, | 21 | | |
| Balkan States, | 12 | | |
| Brazil, | 24 | | |
| British Isles, | 88 | | |
| Canada, | 5 | | |
| Canary Isles and Azores, | 6 | | |
| Caucasia, | 1 | | |
| Central America, | 10 | | |
| Chile, | 4 | | |
| China, | 18 | | |
| Colombia, | 4 | | |
| Denmark, | 14 | | |
| East Africa, | 4 | | |
| Ecuador, | 1 | | |
| France, | 41 | | |

Character of opportunities — *Con.*

Foreign — *Con.*

| | |
|---|---|
| Guiana, | 1 |
| Holland, | 5 |
| India, | 31 |
| Italy, | 26 |
| Japan, | 1 |
| Mexico, | 3 |
| Northern Africa, | 7 |
| Norway and Sweden, | 26 |
| Paraguay, | 1 |
| Peru, | 2 |
| Portugal, | 27 |
| Russia, | 21 |
| South Africa, | 1 |
| Spain, | 53 |
| Straits Settlements, | 1 |
| Switzerland, | 13 |
| Syria, | 1 |
| Uruguay, | 3 |
| West Indies, | 14 |

## INDUSTRIAL HYGIENE.

### (*a*) *Health of Minors.*

Chapter 537 of the Acts of 1907, as amended by section 6 of chapter 726 of the Acts of 1912, provides that —

> Every inspector of the state board of labor and industries shall inform himself concerning the health of all minors employed in factories within his district, and, whenever he may deem it advisable or necessary he shall call the ill health or physical unfitness of any minor to the attention of his or her parents or employers and of the state board of labor and industries.

For obvious reasons this work was not undertaken in any systematic way until the present year. The importance of the study was recognized, but with the force in this department it was not deemed wise to undertake such a labor unless we were in a position to complete some portion of the work in such a way that valuable conclusions might be drawn therefrom. Early in the year the Surgeon-General of the United States Public Health Service, with an appreciation of the demand for such a study, assigned Dr. M. Victor Safford to co-operate with the Board in "studies of the influence of occupations on persons during the period of adolescence with a view to standardizing methods of oversight of such persons to protect their health in the industries." Dr. Eugene J. McCarthy, an inspector for this Board, was assigned to assist in this examination. The mill authorities furnished suitable accommodations, free from noise and interruption, and in many instances the welfare department of the establishments furnished eyeglasses or surgical care when such remedies were suggested by the examining physicians. The report of this important work is published in full in Appendix F.

### (*b*) *Ventilation.*

When we come to the enforcement of law relative to ventilation of factories (section 83, chapter 514, Acts of 1909) all academic discussion and scientific findings concerning the chemical and physical composition of the air are lost in the plain statement that "Factories shall be so ventilated that the air shall not become so impure as to be injurious to the health of persons employed therein, and so that all gases, vapors, dust or other impurities injurious to the health, which are generated in the course of the manufacturing process or handicraft carried on therein, shall, so far as is practicable, be rendered harmless." Definite instructions for removing dust arising from various processes of manufacture are set forth in this law.

The problem of dust, gas and fumes removal has been given such attention by our inspectors during the year, and several important studies of association of these elements with occupational illness have been carried out. All dust, no matter how unirritating in itself, when accumulated in any quantity in the air passages acts as an irritant and produces disease. Attempts to classify dust according to the irritating properties on the respiratory tract places vegetable dust ahead of steel, glass and stone, and gives flax and cotton a higher degree of danger than wool dust. Steel is said to be more irritating than brass, and granite more irritating than marble, while glass is even more irritating than granite. Typical cases of dust danger are shown by the following reports of special investigations: —

### (c) *Talc Manufacture.*

The talc rock is hauled to the mill from the quarry where it is mined in large blocks. These blocks are passed into jaw crushers usually located in the basement of the mill. The rock is crushed into smaller pieces which fall on to a conveyor which carries the material to the top of the building where it falls by various chutes into one of three large storage bins. This crushed material is fed from these bins to rotary crushers also located in the basement, and from these rotary crushers the material passes to a grinder and then to the first floor of the mill where it goes through the finest grinding of the process. After passing through this fine grinding machine on the first floor the material is carried by belts to the second floor, where it passes into an air separator. In this system the finest grade of the talc is carried off by air currents which are being blown through the separator, and then strained out through long tube-like bags, the air escaping and the fine talc falling down into the bagging bins which extend to the first floor of the mill. The heaviest material that is not carried off by the air currents now passes on to screens where it is separated into different sizes and grades and then finally to the respective storage bins. All the bagging of the talc in its different grades is done on the first floor of the mill, and this is a very dusty process, the material being bagged either in cloth or paper bags according to the weight and grade desired. The mill is run by water power and by electric motors. The finest grade of this talc is used in the manufacture of talcum powder and medicines and in the manufacture of paper, where it is used as a filler and to give a glossy finish, also in the manufacture of roofing paper, in the manufacture of rubber, and some is said to find its way into the tobacco and candy industries.

The inspector reports that on the day on which he visited the mill the majority of the windows were wide open. The wind was from the southwest, and as it blew through the plant it carried out dust from the mill to the outside air. The inside of the mill was coated with dust that had settled, and on the floor there was a layer at least an inch in thickness. The atmosphere of the mill was laden with the finer particles of the dust, and was being breathed continuously by the employees. None of the men employed in the mill seemed to feel or show any injurious effects from the dust. Two of the men questioned by the inspector alleged that their health had been benefited since entering this employment. This belief of the employees, however, might be based upon a decision given by the court that talc used in the adulteration of candy was not harmful.

Furniture in houses near this manufacturing establishment was covered with talc dust, and it was found necessary to keep the windows closed even during the summer months. A schoolroom in the neighborhood was also found to have received a large quantity of talc dust.

The talc stone is composed of acid metasilicate of magnesium, — a member of the common soapstone family. As mined, it has a greasy feeling and varies from white to a greenish color.

An inspection of the dust remover showed that there was a leak in the pipe leading from the blower to the air strainer bags through which great quantities of fine-powdered dust escaped; also that the top of the conveyor belt to the storage bins was uncovered. By remedying these defects the quantity of dust in the atmosphere was reduced materially. By screening the windows with fine cloth, and by attention to the chute leading to the jaw crushers, the quantity of dust escaping into the neighborhood was reduced to a minimum.

### (*d*) *Granite Cutting and Lettering.*

The process of lettering on stone is all done in sheds, and while the amount of dust produced during this process is not so great as in the process of surfacing, yet the fact that it is always done inside makes it very bad for the employees, and on entering any of the sheds where lettering is done large amounts of dust can be seen suspended in the air. Very often the employee, in cleaning off the particular piece of granite on which he is working, will apply the blow pipe to the surface of the granite, and a large volume of dust is thereby raised and blown over on to fellow workmen near by.

The process of surfacing on stone is done in the open as a rule. Experiments with dust-removal apparatus for the various processes of stone making have been undertaken from time to time, and it is now possible for all this work to be done with little or no health hazard from dust.

### (*e*) *Pattern Makers.*

This is an extremely hazardous occupation on account of the dust if not overcome by proper dust-exhausting systems. Investigations show that many of these establishments are poorly ventilated and lighted. The nature of much of the work is such that a very fine dust is created, which is readily inhaled. This is particularly true on lathe work and on the planers and saws. Eighteen establishments were investigated and the various kinds of processes studied. In 15 of these places dust derived from wood, sandpaper and various machines was evident on the sides of the rooms, floors, men's hair, faces, caps, overalls and in the air. Many places depended entirely upon open windows for ventilation. Spitting on the dusty floors was very common. Inadequate washing facilities, toilets which ventilate into the workroom, and the use of a common drinking cup and a common towel prevailed quite generally. The workmen interviewed complained of dust bronchitis and dry throats. Special complaint is made by the men against the dust from the band saw and sander. Others complained of the circular saw and the buzz planer.

The greatest difficulty in correcting these conditions is on the lathe machine. Often when a satisfactory dust exhaust hood has been installed the men find it impossible to work with the hood in position at all times. Many times the hood is thrown back by the workmen and not replaced.

That most of the injurious effects of dust in the pattern-making business can be removed by suitable exhaust systems is well demonstrated in many of the newer and up-to-date establishments.

### (*f*) *Brass Dust.*

An investigation of a plant where a blower exhaust system had been installed to care for the brass dust showed that the pipes of the exhaust system were blocked in such a way that no suction was created. This plant had been in operation two years. The correction of this defect reduced the dust hazard in this establishment to a negligible quantity. Many cases of brass dust have been investigated by our inspectors during the year, and letters on file in the office show that this feature of our work is very much appreciated by those engaged in the industries.

### (*g*) *Gas Poisoning.*

The importance of gas poisoning as a cause of illness and death has received considerable attention during the year because of the establishment in this State of factories in which the various nitrobenzol and nitrotoluol derivatives are being manufactured, and factories for the manufacture of explosive compounds in which these substances are used. In addition to these nitro compounds there has been in recent years a wide extension and use of water gas and similar gases for heating furnaces and for boilers in factories, also for driving gas engines for welding, for automobile power, as well as for many industrial and domestic purposes. The source of danger in all this latter group is carbonic oxide poisoning (carbon monoxide, CO.). Some forms of the gas are so free from odor that their presence in the atmosphere is not appreciated.

The chief causes for the casualties and sources of illnesses that have come to our notice from gas poisoning are —

1. Leakage from joints or taps in flues or ducts conveying the gas from one retort or department to another.
2. Gradual escaping of the gas into the atmosphere in confined rooms.
3. Cleaning of tanks or flues before the gas has wholly escaped.
4. Inodorous nature of the gas.
5. Ignorance on the part of workmen of the dangerous nature of the gas and of the early symptoms produced by it.
6. Lack of adequate protection against the inhalation of the gas, as well as adequate rescue appliances for immediate use.

7. Incomplete combustion of gas in defective cooking, ironing and similar apparatus. No doubt much of the anæmia, debility, headache, defective nutrition, etc., common to workers on ironing machines heated by gas, and to bakers working in the same kind of atmosphere, is due to chronic poisoning by carbonic oxide brought about by daily breathing the gas in amounts too small to produce immediate effects.

Complaints have reached us of cases of dizziness, nausea and unconsciousness experienced by plasterers and wood finishers working in rooms heated by salamanders during building construction, without an outlet for the escape of the gas from these heaters.

Two deaths have been reported to this department during the year in which poisoning by nitrobenzol derivatives in the process of picric acid manufacture is the alleged cause. The symptoms of gas poisoning vary in intensity from headache, vertigo, palpitation of the heart, excitability and nausea with gradual muscular weakness to convulsions, unconsciousness and death.

In view of the growing importance of this subject in this country, and because of the scant notice heretofore given to these dangers in medical and scientific literature, a further description of the nature of the gases and their action on the human body is desirable.

### (*h*) *Munition Gas Poisoning.*

A characteristic of the symptoms of poisoning by these gases — one of great value — is the frequency with which a period varying from a few hours to a day intervenes during which the person feels quite well, only to succumb suddenly to a fatal termination. The following cases coming to our attention during the year will illustrate this fact: —

A carpenter working about the nitrating plant of a *munition* works was seen by a physician Tuesday morning. The man complained of being dizzy, and reported that he had had a similar attack of dizziness the day before while at work in the T. N. T. building and had gone home for the day. He did not feel able to work Tuesday, but did not exhibit any serious signs of gas poisoning, but at 4 P.M. on the same day he became suddenly worse and died in coma at 12 o'clock that night. Autopsy findings were returned as indicative of gas poisoning.

Another fatal case reported was that of a chemist at a *phenol* manufacturing plant who was exposed to poisoning on Sunday afternoon. He complained of ringing in the ears and dizziness and disturbed vision. After a short rest he left the building to go to another department, and was found dead on the road the next morning, having died some time shortly after leaving the works.

The following instructions were given to the management of the plants at which cases of gas poisoning were reported: —

1. That protection should be afforded to the employees, so that the various compounds handled are not touched by the bare hand or allowed to touch the clothes.
2. That the footwear is such that poisons do not reach the skin of the feet.
3. Opportunities for thoroughly washing the hands before eating.
4. Opportunities for changing the clothes before beginning work and at the end of work.
5. Opportunities for eating luncheon in some room other than the workroom.
6. A tank of oxygen to be kept on the premises for immediate treatment of acute cases.
7. Thorough ventilation of the workroom and adequate exhaust system for removing fumes and gases.
8. Medical supervision of all employees, including a physical examination before employment and at stated periods during employment.
9. Suitable helmets for rescue work and for cleaning retorts.

### (*i*) *Humidification.*

During the year the use of water from a polluted stream that was the source of water used for humidification for a large group of mills was condemned by the department, and the adoption of an artesian well water supply provided for the mills. The special study of temperature and humidification of the textile industry should be undertaken, and again we renew the suggestion made in the report of last year that a committee be organized for this purpose.

### (j) *Lighting.*

The State Board of Labor and Industries is charged by special legislation to investigate and ascertain whether or not factories and workshops are adequately lighted, and to specify changes necessary in order that such establishments shall be properly lighted if not in conformity with standards established by the Board. The statute requires further that the Board shall —

> Make such investigation concerning the eye and vision in their relation to diseases of occupation, including injuries to the eyes of the employees, and to the pathological effects which are produced or promoted by the circumstances under which the various occupations are carried on, as, in the opinion of said board is practicable, and the board shall from time to time issue such printed matter containing suggestions to employers and employees for the protection of the eyes of the employees as it may deem advisable.

This is a most important duty which it is hoped may be undertaken during the year 1916.

### (k) *Drinking Water.*

The question of industrial establishments providing fresh and pure drinking water for employees has come to our notice several times during the year because of the complaint that the water furnished for this purpose came from contaminated wells. Through the co-operation of the State Department of Health analyses have been furnished of waters from such sources, and in many instances the use of such water has been ordered discontinued because of its impure nature.

### (l) *Medical Chests and Rooms for Injured or Sick Employees.*

The law requiring establishments to keep on hand an improved medical and surgical chest for the treatment of employees hurt on the premises is being observed widely. Many establishments have, in addition to this first-aid material, set aside a suitable room for the care of persons taken ill on the premises. In many instances trained nurses are in daily attendance and physicians within call.

## OCCUPATIONAL DISEASES.

In June, 1915, in accordance with action taken by the Joint Board of Labor and Industries and the Industrial Accident Board, the medical profession was invited to co-operate and assist in the proper return to this Board of industrial and occupational diseases. Since that time there has been a wider interest and keener appreciation of industrial diseases by the medical profession in this State.

| | Cases. |
|---|---|
| Lead poisoning (2 deaths), | 67 |
| Gas poisoning (2 deaths), | 14 |
| Caisson disease, | 15 |
| Anthrax, | 3 |
| Cigar neurosis, | 3 |
| Dermatitis, | 6 |
| Miscellaneous, | 5 |
| Total, | 113 |

Analyses of these cases will be found in Appendix E of this report.

## CONCLUSION.

In submitting this report of the activities of the department during the past year I regret that it must appear as a somewhat incomplete statement. This is unavoidable because many of the details concerned in our work are not subjects to be included in the annual report, first, because of the varied character of the work; and second, because space would forbid.

If success has attended our efforts in the past year it is largely due to the co-operation which has been accorded the commissioner by each member of the department, and at this time I desire to express my appreciation of the work of our deputies, inspectors and office force.

In conclusion, I desire to thank the State Board of Labor and Industries for the manner in which every suggestion of the Commissioner of Labor was received, and for the opportunity of working with them in an effort to better the conditions of those who labor, and to upbuild the industries of Massachusetts.

Respectfully submitted,

EDWIN MULREADY,
*Commissioner of Labor.*

# APPENDICES.

# APPENDIX A.

## EXPENDITURES FOR THE YEAR ENDING NOV. 30, 1915.

| | |
|---|---|
| Salaries of members of the Board, | $5,220 40 |
| Salaries of Commissioner of Labor and deputies, | 11,000 00 |
| Salaries of inspectors and investigators, | 39,193 54 |
| Salaries of counsel, stenographers and office assistants, | 15,752 90 |
| Traveling expenses, | 7,467 87 |
| Rent and care of offices, | 8,211 69 |
| Contingent expenses, including printing, books, postage, stationery, office supplies, typewriters, telephone and sundries, | 10,865 05 |
| Total, | $97,711 45 |

## APPENDIX B.

---

ESTIMATE FOR APPROPRIATION FOR THE YEAR ENDING NOV. 30, 1916.

| | | |
|---|---|---|
| Salaries of members of the Board, | | $5,500 00 |
| Salaries of Commissioner of Labor and deputies, | | 13,500 00 |
| Salaries of inspectors, | | 39,250 00<br>18,000 00[1] |
| Salaries of expert investigators, | | 2,900 00 |
| Salary of counsel, | | 3,500 00 |
| Clerical and other assistants, | | 17,324 00<br>1,500 00[1] |
| Traveling expenses, | | 12,000 00 |
| Rent and care of offices, | | 9,000 00 |
| Contingent: — | | |
| Books, maps, etc., | $1,000 00 | |
| Expressage, | 200 00 | |
| Postage, | 1,500 00 | |
| Printing: — | | |
| Annual report, | 500 00 | |
| Other reports, | 2,500 00 | |
| Office forms, | 5,000 00 | |
| Stationery and office supplies, | 3,000 00 | |
| Typewriter machines, | 500 00 | |
| Telephone and telegrams, | 2,000 00 | |
| | | 16,200 00 |
| Total, | | $138,674 00 |

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[1] This amount will be necessary if 12 additional inspectors are appointed in accordance with recommendation of the State Board of Labor and Industries.

# APPENDIX C.

Number of Persons to whom Certificates were issued and the Number of Certificates issued under the Provisions of Acts of 1913, Chapter 779, from Jan. 1, 1915, to Dec. 31, 1915, inclusive:

| | Number of Persons issued Certificates. | | | Number of Certificates issued. | | |
|---|---|---|---|---|---|---|
| | Educational (Literate). | Educational (Illiterate). | Employment. | Educational (Literate). | Educational (Illiterate). | Employment. |
| Abington, | 100 | 12 | 15 | 210 | 12 | 19 |
| Acton, | 2 | – | – | 2 | – | – |
| Acushnet, | 40 | 8 | 26 | 62 | 16 | 32 |
| Adams, | 410 | 50 | 214 | 517 | 51 | 249 |
| Agawam, | 51 | 2 | 20 | 119 | 5 | 47 |
| Alford, | – | – | – | – | – | – |
| Amesbury, | 225 | 4 | 49 | 549 | 4 | 70 |
| Amherst, | 12 | – | 8 | 12 | – | 8 |
| Andover, | 180 | 1 | 50 | 260 | 1 | 80 |
| Arlington, | 146 | – | 27 | 190 | – | 33 |
| Ashburnham, | 13 | – | 14 | 15 | – | 15 |
| Ashby, | 2 | – | 1 | 2 | – | 1 |
| Ashfield, | 2 | – | – | 2 | – | – |
| Ashland, | 38 | – | 8 | 54 | – | 12 |
| Athol, | 291 | 24 | 102 | 345 | 31 | 133 |
| Attleboro, | 589 | 60 | 243 | 778 | 76 | 343 |
| Auburn, | 90 | 5 | 39 | 122 | 8 | 55 |
| Avon, | 23 | – | 14 | 73 | – | 20 |
| Ayer, | 10 | – | 12 | 15 | – | 18 |
| Barnstable, | 8 | – | 9 | 8 | – | 9 |
| Barre, | 16 | 6 | 16 | 16 | 6 | 16 |
| Becket, | 9 | – | 4 | 10 | – | 4 |
| Bedford, | 6 | – | – | 8 | – | – |
| Belchertown, | 5 | – | 12 | 5 | – | 12 |
| Bellingham, | 19 | 3 | 6 | 21 | 3 | 6 |
| Belmont, | 76 | 3 | 7 | 95 | 4 | 8 |
| Berkley, | 8 | – | 4 | 11 | – | 8 |
| Berlin, | 8 | 2 | 3 | 11 | 2 | 3 |
| Bernardston, | 1 | – | 1 | 1 | – | 1 |
| Beverly, | 371 | 23 | 81 | 835 | 48 | 119 |
| Billerica, | 120 | – | 174 | 147 | – | 193 |
| Blackstone, | 96 | 7 | 83 | – | – | – |
| Blandford, | – | – | – | – | – | – |
| Bolton, | 2 | – | 2 | 2 | – | 2 |
| Boston, | 10,291 | 957 | 3,686 | 25,510 | 2,200 | 7,056 |
| Bourne, | 4 | – | 2 | 5 | – | 2 |
| Boxborough, | – | – | – | – | – | – |
| Boxford, | 2 | – | – | 2 | – | – |
| Boylston, | 8 | – | 10 | 12 | – | 13 |
| Braintree, | 190 | 5 | 87 | 228 | 5 | 104 |
| Brewster, | – | – | – | – | – | – |
| Bridgewater, | 91 | 23 | 37 | 91 | 20 | 39 |
| Brimfield, | 5 | – | 2 | 5 | – | 2 |
| Brockton, | – | – | – | 3,338 | 245 | 499 |
| Brookfield, | 54 | 3 | 19 | 70 | 3 | 24 |
| Brookline, | 180 | – | 39 | 332 | – | 39 |
| Buckland, | 17 | – | 4 | 18 | – | 4 |
| Burlington, | 1 | – | – | 1 | – | – |

NUMBER OF PERSONS TO WHOM CERTIFICATES WERE ISSUED, ETC. — *Continued.*

| | Number of Persons issued Certificates. | | | Number of Certificates issued. | | |
|---|---|---|---|---|---|---|
| | Educational (Literate). | Educational (Illiterate). | Employment. | Educational (Literate). | Educational (Illiterate). | Employment. |
| Cambridge, | 2,793 | 201 | 745 | 4,403 | 288 | 1,109 |
| Canton, | 110 | 26 | 20 | 92 | 20 | 15 |
| Carlisle, | – | – | – | – | – | – |
| Carver, | – | – | 1 | – | – | 1 |
| Charlemont, | 3 | – | – | 3 | – | – |
| Charlton, | 27 | 1 | 6 | 27 | 1 | 7 |
| Chatham, | 2 | – | 2 | 2 | – | 2 |
| Chelmsford, | 140 | – | 59 | 164 | – | 84 |
| Chelsea, | 1,215 | 257 | 263 | 1,962 | 382 | 368 |
| Cheshire, | 18 | 1 | 3 | 22 | 1 | 3 |
| Chester, | 3 | – | 1 | 3 | – | 1 |
| Chesterfield, | – | – | – | – | – | – |
| Chicopee, | 944 | 138 | 378 | 1,243 | 149 | 413 |
| Chilmark, | – | – | – | – | – | – |
| Clarksburg, | 9 | – | 6 | 11 | – | 6 |
| Clinton, | 304 | 34 | 170 | 304 | 34 | 170 |
| Cohasset, | 4 | – | – | 4 | – | – |
| Colrain, | 5 | – | 5 | 5 | – | 5 |
| Concord, | 15 | 2 | 75 | 16 | 2 | 93 |
| Conway, | 12 | – | 3 | 12 | – | 3 |
| Cummington, | – | – | – | – | – | – |
| Dalton, | 68 | – | 11 | 73 | – | 12 |
| Dana, | 4 | – | – | 4 | – | – |
| Danvers, | 221 | 10 | 217 | 407 | 16 | 400 |
| Dartmouth, | 91 | 17 | 37 | 115 | 24 | 45 |
| Dedham, | 156 | 6 | 44 | 228 | 10 | 52 |
| Deerfield, | 10 | 4 | 4 | 10 | 4 | 4 |
| Dennis, | – | – | – | – | – | – |
| Dighton, | 29 | – | 11 | 35 | – | 13 |
| Douglas, | 100 | 22 | 56 | 85 | 10 | 48 |
| Dover, | 6 | – | – | 7 | – | – |
| Dracut, | 139 | 2 | 26 | 153 | 2 | 26 |
| Dudley, | 294 | 35 | 329 | 411 | 37 | 548 |
| Dunstable, | – | – | – | – | – | – |
| Duxbury, | 2 | – | – | 4 | – | – |
| East Bridgewater, | 56 | 5 | 9 | 67 | 6 | 10 |
| East Longmeadow, | 36 | 2 | 10 | 50 | 3 | 11 |
| Eastham, | – | – | – | – | – | – |
| Easthampton, | 498 | 166 | 160 | 548 | 176 | 185 |
| Easton, | 117 | 3 | 14 | 155 | 3 | 17 |
| Edgartown, | – | – | 5 | – | – | 5 |
| Egremont, | – | – | – | – | – | – |
| Enfield, | 1 | – | – | 1 | – | – |
| Erving, | 26 | – | 10 | 29 | – | 13 |
| Essex, | 13 | – | 4 | 14 | – | 4 |
| Everett, | 557 | 23 | 305 | 1,153 | 31 | 330 |
| Fairhaven, | 205 | 15 | 48 | 272 | 18 | 61 |
| Fall River, | 2,746 | 575 | 2,137 | 5,507 | 968 | 4,023 |
| Falmouth, | 4 | – | 5 | 4 | – | 5 |
| Fitchburg, | 429 | 93 | 386 | 1,443 | 177 | 630 |
| Florida, | 3 | – | – | 3 | – | – |
| Foxborough, | 57 | – | 6 | 87 | – | 6 |
| Framingham, | 451 | 53 | 139 | 569 | 62 | 155 |
| Franklin, | 143 | 29 | 30 | 175 | 34 | 39 |
| Freetown, | 13 | – | 9 | 13 | – | 9 |
| Gardner, | 300 | 74 | 165 | 356 | 86 | 181 |
| Gay Head, | – | – | – | – | – | – |
| Georgetown, | 49 | 4 | 10 | 62 | 4 | 15 |
| Gill, | – | – | – | – | – | – |
| Gloucester, | 583 | 25 | 137 | 649 | 25 | 162 |
| Goshen, | – | – | 1 | – | – | 1 |
| Gosnold, | – | – | – | – | – | – |
| Grafton, | 144 | 16 | 65 | 163 | 16 | 70 |
| Granby, | 5 | – | – | 4 | – | – |
| Granville, | 1 | – | 2 | 1 | – | 2 |

NUMBER OF PERSONS TO WHOM CERTIFICATES WERE ISSUED, ETC. — *Continued.*

| | Number of Persons issued Certificates. | | | Number of Certificates issued. | | |
|---|---|---|---|---|---|---|
| | Educational (Literate). | Educational (Illiterate). | Employment. | Educational (Literate). | Educational (Illiterate). | Employment. |
| Great Barrington, | 61 | 4 | 29 | 67 | 4 | 34 |
| Greenfield, | 142 | 4 | 59 | 292 | 11 | 90 |
| Greenwich, | – | – | – | – | – | – |
| Groton, | 7 | – | 1 | 9 | – | 1 |
| Groveland, | – | – | – | – | – | – |
| Hadley, | 6 | 1 | 4 | 6 | 1 | 4 |
| Halifax, | 1 | – | – | 1 | – | – |
| Hamilton, | 20 | 1 | 5 | 22 | 1 | 5 |
| Hampden, | 2 | – | – | 2 | – | – |
| Hancock, | 15 | – | 4 | 18 | – | 4 |
| Hanover, | 34 | 23 | 8 | 39 | 23 | 9 |
| Hanson, | 32 | – | 11 | 32 | – | 11 |
| Hardwick, | 37 | 22 | 40 | 49 | 22 | 43 |
| Harvard, | – | – | – | – | – | – |
| Harwich, | 5 | – | – | 5 | – | – |
| Hatfield, | 10 | 17 | – | 10 | 17 | – |
| Haverhill, | 1,920 | 334 | 438 | 3,190 | 508 | 860 |
| Hawley, | 1 | – | 1 | 1 | – | 1 |
| Heath, | – | – | – | – | – | – |
| Hingham, | 23 | – | 4 | 27 | – | 4 |
| Hinsdale, | 12 | 1 | 5 | 13 | 1 | 7 |
| Holbrook, | 83 | – | 14 | 106 | – | 22 |
| Holden, | 33 | – | 14 | 34 | – | 14 |
| Holland, | 1 | – | – | 1 | – | – |
| Holliston, | 64 | 4 | 7 | 72 | 5 | 9 |
| Holyoke, | 1,253 | 138 | 567 | 2,171 | 177 | 645 |
| Hopedale, | 81 | 2 | 31 | 88 | 2 | 31 |
| Hopkinton, | 46 | – | 6 | 68 | – | 10 |
| Hubbardston, | 2 | – | 4 | 2 | – | 5 |
| Hudson, | – | – | – | 299 | 31 | 134 |
| Hull, | 12 | – | 1 | 12 | – | 1 |
| Huntington, | 18 | – | 3 | 18 | – | 3 |
| Ipswich, | 108 | 59 | 37 | 144 | 67 | 46 |
| Kingston, | 54 | 5 | 9 | 66 | 6 | 12 |
| Lakeville, | 11 | – | 2 | 14 | – | 2 |
| Lancaster, | 28 | – | 12 | 35 | – | 15 |
| Lanesborough, | 13 | – | 1 | 15 | – | 1 |
| Lawrence, | – | – | – | 4,455 | 966 | 1,610 |
| Lee, | 65 | 1 | 24 | 90 | 1 | 30 |
| Leicester, | 94 | 4 | 38 | 129 | 4 | 42 |
| Lenox, | 19 | – | 4 | 19 | – | 4 |
| Leominster, | 560 | 78 | 209 | 804 | 97 | 289 |
| Leverett, | – | – | 1 | – | – | 1 |
| Lexington, | 28 | – | 3 | 40 | – | 3 |
| Leyden, | – | – | 1 | – | – | 1 |
| Lincoln, | – | – | – | 2 | – | – |
| Littleton, | – | – | – | – | – | – |
| Longmeadow, | 15 | – | – | 16 | – | – |
| Lowell, | 1,950 | 92 | 391 | 5,334 | 537 | 1,588 |
| Ludlow, | 101 | 75 | 125 | 135 | 101 | 162 |
| Lunenburg, | 7 | – | – | 14 | – | – |
| Lynn, | 1,262 | 94 | 229 | 1,264 | 91 | 118 |
| Lynnfield, | 7 | – | – | 8 | – | – |
| Malden, | 2,000 | 50 | 500 | 1,200 | 75 | 300 |
| Manchester, | 18 | – | 15 | 16 | – | 17 |
| Mansfield, | 104 | 17 | 14 | 128 | 24 | 14 |
| Marblehead, | 15 | – | 197 | 22 | – | 230 |
| Marion, | 1 | – | 6 | 1 | – | 6 |
| Marlborough, | 1,151 | 22 | 263 | 1,413 | 27 | 334 |
| Marshfield, | 1 | – | – | 1 | – | – |
| Mashpee, | – | – | – | – | – | – |
| Mattapoisett, | 6 | – | – | 7 | – | – |
| Maynard, | 163 | 26 | 30 | 163 | 26 | 30 |
| Medfield, | 15 | – | 7 | 15 | – | 8 |
| Medford, | 479 | 7 | 76 | 590 | 9 | 92 |
| Medway, | 14 | 1 | 8 | 17 | 1 | 9 |

NUMBER OF PERSONS TO WHOM CERTIFICATES WERE ISSUED, ETC. — *Continued.*

| | NUMBER OF PERSONS ISSUED CERTIFICATES. | | | NUMBER OF CERTIFICATES ISSUED. | | |
|---|---|---|---|---|---|---|
| | Educational (Literate). | Educational (Illiterate). | Employment. | Educational (Literate). | Educational (Illiterate). | Employment. |
| Melrose, | 258 | 1 | 38 | 298 | 1 | 41 |
| Mendon, | 18 | – | 6 | 20 | – | 6 |
| Merrimac, | 56 | – | 15 | 62 | – | 14 |
| Methuen, | 511 | 27 | 205 | 1,736 | 71 | 453 |
| Middleborough, | 220 | 6 | 25 | 261 | 6 | 33 |
| Middlefield, | – | – | – | – | – | – |
| Middleton, | 8 | – | 2 | 8 | – | 2 |
| Milford, | 217 | 19 | 83 | 287 | 27 | 84 |
| Millbury, | 145 | 5 | 68 | 180 | 8 | 90 |
| Millis, | 22 | – | 6 | 22 | – | 6 |
| Milton, | 80 | – | 10 | 102 | – | 11 |
| Monroe, | – | – | – | – | – | – |
| Monson, | 55 | 2 | 20 | 86 | 2 | 26 |
| Montague, | 119 | 14 | 38 | 123 | 14 | 45 |
| Monterey, | 1 | – | – | 1 | – | 1 |
| Montgomery, | 1 | – | 1 | 1 | – | 1 |
| Mount Washington, | – | – | – | – | – | – |
| Nahant, | 20 | 1 | 3 | 19 | 1 | 3 |
| Nantucket, | 43 | – | 14 | 44 | – | 14 |
| Natick, | 172 | 15 | 31 | 210 | 19 | 45 |
| Needham, | 123 | 14 | 25 | 143 | 14 | 26 |
| New Ashford, | – | – | – | – | – | – |
| New Bedford, | 826 | 424 | 1,389 | 5,629 | 1,368 | 2,651 |
| New Braintree, | – | – | – | – | – | – |
| New Marlborough, | – | – | – | – | – | – |
| New Salem, | – | – | – | – | – | – |
| Newbury, | 20 | – | 2 | 24 | – | 2 |
| Newburyport, | 300 | 26 | 84 | 757 | 35 | 152 |
| Newton, | 649 | 78 | 159 | 897 | 106 | 182 |
| Norfolk, | 4 | – | 1 | 1 | – | 4 |
| North Adams, | 472 | 33 | 68 | 1,204 | 73 | 334 |
| North Andover, | 217 | 8 | 69 | 288 | 14 | 85 |
| North Attleborough, | 168 | 5 | 61 | 183 | 5 | 76 |
| North Brookfield, | 48 | – | 4 | 52 | – | 5 |
| North Reading, | 6 | – | 2 | 6 | – | 2 |
| Northampton, | 465 | 40 | 160 | 548 | 46 | 219 |
| Northborough, | 30 | 1 | 7 | 35 | 1 | 7 |
| Northbridge, | 396 | 27 | 131 | 435 | 27 | 158 |
| Northfield, | – | – | 1 | 1 | – | 1 |
| Norton, | 27 | – | 23 | 52 | – | 43 |
| Norwell, | 8 | – | 2 | 10 | – | 2 |
| Norwood, | 177 | 25 | 20 | 200 | 26 | 20 |
| Oak Bluffs, | – | – | 2 | – | – | 2 |
| Oakham, | – | – | 1 | – | – | 1 |
| Orange, | 96 | – | 19 | 111 | – | 19 |
| Orleans, | 3 | – | 4 | 4 | – | 5 |
| Otis, | 2 | – | 1 | 2 | – | 1 |
| Oxford, | 37 | 7 | 32 | 36 | 7 | 34 |
| Palmer, | 143 | 225 | 154 | 202 | 385 | 226 |
| Paxton, | 2 | – | – | 3 | – | – |
| Peabody, | 329 | 108 | 59 | 589 | 173 | 111 |
| Pelham, | 3 | – | – | 4 | – | – |
| Pembroke, | 14 | – | – | 16 | – | – |
| Pepperell, | 27 | – | 6 | 30 | – | 7 |
| Peru, | 2 | – | – | 2 | – | – |
| Petersham, | 1 | – | – | 1 | – | – |
| Phillipston, | 1 | – | 2 | 1 | – | 2 |
| Pittsfield, | 1,347 | 112 | 237 | 1,160 | 86 | 203 |
| Plainfield, | – | – | – | – | – | – |
| Plainville, | 18 | – | 7 | 23 | – | 11 |
| Plymouth, | 243 | 53 | 76 | 293 | 58 | 81 |
| Plympton, | 7 | – | – | 7 | – | – |
| Prescott, | – | – | – | – | – | – |
| Princeton, | 1 | – | 1 | 1 | – | 1 |
| Provincetown, | 13 | – | 5 | 13 | – | 5 |
| Quincy, | 1,209 | 20 | 398 | 1,511 | 24 | 476 |

Number of Persons to whom Certificates were issued, etc. — *Continued.*

| | Number of Persons issued Certificates. | | | Number of Certificates issued. | | |
|---|---|---|---|---|---|---|
| | Educational (Literate). | Educational (Illiterate). | Employment. | Educational (Literate). | Educational (Illiterate). | Employment. |
| Randolph, | 93 | – | 12 | 123 | – | 16 |
| Raynham, | 17 | 4 | – | 25 | 6 | – |
| Reading, | 94 | 2 | 18 | 123 | 2 | 20 |
| Rehoboth, | 8 | – | 6 | 9 | – | 6 |
| Revere, | 547 | 24 | 145 | 780 | 28 | 174 |
| Richmond, | – | – | – | – | – | – |
| Rochester, | 3 | – | – | 3 | – | – |
| Rockland, | 163 | 1 | 34 | 204 | 1 | 38 |
| Rockport, | 72 | 2 | 16 | 79 | 2 | 21 |
| Rowe, | – | – | – | – | – | – |
| Rowley, | 10 | – | 8 | 10 | – | 8 |
| Royalston, | 12 | 2 | 8 | 14 | 2 | 11 |
| Russell, | 18 | 5 | 3 | 18 | 5 | 3 |
| Rutland, | 14 | – | 5 | 15 | – | 5 |
| Salem, | 656 | 54 | 248 | 1,768 | 193 | 324 |
| Salisbury, | 34 | – | 2 | 46 | – | 2 |
| Sandisfield, | – | – | – | – | – | – |
| Sandwich, | 2 | – | – | 2 | – | – |
| Saugus, | 254 | 5 | 36 | 336 | 8 | 50 |
| Savoy, | 3 | – | 1 | 3 | – | 1 |
| Scituate, | 9 | – | – | 9 | – | – |
| Seekonk, | 3 | – | 7 | 5 | – | 16 |
| Sharon, | 4 | – | 1 | 4 | – | 1 |
| Sheffield, | 1 | 1 | 1 | 4 | – | – |
| Shelburne, | 2 | – | 2 | 2 | – | 2 |
| Sherborn, | 14 | – | 3 | 16 | – | 4 |
| Shirley, | 17 | 2 | 12 | 28 | 2 | 14 |
| Shrewsbury, | 13 | 1 | 3 | 17 | 1 | 4 |
| Shutesbury, | – | – | 2 | – | – | 2 |
| Somerset, | 16 | – | 30 | 45 | – | 48 |
| Somerville, | 1,219 | 71 | 354 | 2,424 | 120 | 525 |
| South Hadley, | 84 | 2 | 38 | 98 | 2 | 42 |
| Southampton, | – | – | – | – | – | – |
| Southborough, | 11 | 8 | 3 | 12 | 8 | 6 |
| Southbridge, | 524 | 194 | 116 | 611 | 221 | 119 |
| Southwick, | 4 | – | – | 5 | – | – |
| Spencer, | 79 | – | 85 | 85 | – | 104 |
| Springfield, | 2,972 | 357 | 598 | 3,874 | 545 | 1,051 |
| Sterling, | 3 | – | – | 3 | – | – |
| Stockbridge, | 4 | – | 4 | 4 | – | 5 |
| Stoneham, | 231 | 3 | 71 | 242 | 6 | 71 |
| Stoughton, | – | – | – | – | – | – |
| Stow, | 6 | – | 6 | 6 | – | 6 |
| Sturbridge, | 31 | – | 11 | 41 | – | 17 |
| Sudbury, | 9 | – | – | 9 | – | – |
| Sunderland, | 2 | – | – | 2 | – | – |
| Sutton, | 74 | 12 | 18 | 80 | 12 | 64 |
| Swampscott, | 95 | 2 | 8 | 100 | 2 | 11 |
| Swansea, | 12 | – | 32 | 40 | – | 51 |
| Taunton, | 807 | 162 | 207 | 1,045 | 201 | 262 |
| Templeton, | 30 | 3 | 14 | 37 | 4 | 21 |
| Tewksbury, | 17 | – | 3 | 19 | – | 3 |
| Tisbury, | – | – | 3 | – | – | 3 |
| Tolland, | – | – | – | – | – | – |
| Topsfield, | 4 | – | – | 4 | – | – |
| Townsend, | 9 | – | 10 | 9 | – | 10 |
| Truro, | 4 | – | 2 | 4 | – | 2 |
| Tyngsborough, | 16 | – | 5 | 21 | – | 6 |
| Tyringham, | 2 | – | – | 2 | – | – |
| Upton, | 87 | – | 2 | 119 | – | 2 |
| Uxbridge, | 159 | 46 | 74 | 129 | 23 | 54 |
| Wakefield, | 149 | 28 | 31 | 80 | 12 | 8 |
| Wales, | 2 | – | – | 2 | – | – |
| Walpole, | 86 | 4 | 9 | 96 | 4 | 9 |
| Waltham, | 788 | 66 | 116 | 1,137 | 88 | 162 |
| Ware, | 209 | 88 | 114 | 224 | 93 | 124 |

NUMBER OF PERSONS TO WHOM CERTIFICATES WERE ISSUED, ETC. — *Concluded.*

| | Number of Persons issued Certificates. | | | Number of Certificates issued. | | |
|---|---|---|---|---|---|---|
| | Educational (Literate). | Educational (Illiterate). | Employment. | Educational (Literate). | Educational (Illiterate). | Employment. |
| Wareham, | 39 | 12 | 17 | 43 | 15 | 27 |
| Warren, | 70 | 16 | 53 | 86 | 16 | 76 |
| Warwick, | – | – | 1 | – | – | 1 |
| Washington, | 3 | – | – | 3 | – | – |
| Watertown, | 319 | 34 | 34 | 440 | 36 | 38 |
| Wayland, | 15 | – | – | 22 | – | – |
| Webster, | 1,437 | 73 | 1,510 | 1,215 | 67 | 1,282 |
| Wellesley, | 35 | 1 | – | 44 | 1 | – |
| Wellfleet, | 6 | – | 4 | 6 | – | 4 |
| Wendell, | 3 | – | 3 | 3 | – | 5 |
| Wenham, | 8 | – | – | 4 | – | – |
| West Boylston, | 2 | 1 | 6 | 3 | 2 | 9 |
| West Bridgewater, | 46 | – | 13 | 53 | – | 16 |
| West Brookfield, | 14 | – | 7 | 15 | – | 7 |
| West Medway, | 13 | 2 | 7 | 11 | 2 | 6 |
| West Newbury, | 11 | – | – | 13 | – | – |
| West Springfield, | 333 | 31 | 90 | 454 | 36 | 121 |
| West Stockbridge, | 1 | – | 1 | 1 | – | 1 |
| West Tisbury, | – | – | – | – | – | – |
| Westborough, | 109 | – | 20 | 136 | – | 26 |
| Westfield, | 325 | 39 | 118 | 388 | 43 | 204 |
| Westford, | 46 | 9 | 20 | 36 | 6 | – |
| Westhampton, | – | – | – | – | – | – |
| Westminster, | 10 | – | 7 | 11 | – | 10 |
| Weston, | 6 | – | 2 | 6 | – | 2 |
| Westport, | 38 | 3 | 17 | 47 | 4 | 22 |
| Westwood, | 12 | – | – | 15 | – | – |
| Weymouth, | 159 | 1 | 53 | 332 | 5 | 76 |
| Whately, | 2 | – | 1 | 2 | – | 1 |
| Whitman, | 196 | 1 | 21 | 275 | 1 | 25 |
| Wilbraham, | 19 | 79 | 9 | 20 | 79 | 10 |
| Williamsburg, | 37 | 6 | 20 | 39 | 6 | 21 |
| Williamstown, | 42 | – | 20 | 56 | – | 23 |
| Wilmington, | 16 | – | 6 | 18 | – | 6 |
| Winchendon, | 194 | 18 | 65 | 200 | 18 | 70 |
| Winchester, | 79 | 4 | 28 | 99 | 8 | 31 |
| Windsor, | 1 | – | – | 1 | – | – |
| Winthrop, | 141 | 2 | 30 | 184 | 2 | 31 |
| Woburn. | 306 | 13 | 39 | 383 | 16 | 43 |
| Worcester, | 2,222 | 183 | 1,994 | 8,539 | 610 | 2,696 |
| Worthington, | 12 | – | 2 | 12 | – | 2 |
| Wrentham, | 7 | – | 1 | 7 | – | 1 |
| Yarmouth, | – | – | – | – | – | – |
| Totals, | 64,780 | 7,087 | 25,250 | 123,458 | 19,019 | 40,001 |

# APPENDIX D.

## BILLS PRESENTED TO THE LEGISLATURE BY THE STATE BOARD OF LABOR AND INDUSTRIES.

### AN ACT TO PROVIDE FOR REGULATING INDUSTRIAL WORK DONE IN TENEMENTS AND DWELLING HOUSES.

SECTION 1. Every person operating a manufacturing establishment, and every person acting as a contractor or subcontractor for a manufacturing establishment, who, whether by himself or through agents, servants or foremen, contracts for the manufacturing, altering, repairing or finishing of any articles in a tenement or dwelling house, or gives out material from which any such articles are, in whole or in part, to be manufactured, altered, repaired or finished, in a tenement or dwelling house, shall keep a register plainly written in English containing the names and addresses of the persons to whom such articles or materials are given to be so manufactured, altered, repaired or finished, or with whom he has contracted to do the same, and stating the kind of articles or materials given to each person; and shall issue with all such articles or materials a label bearing the name and place of business of such factory written or printed legibly in English. The register shall be subject to inspection by the state board of labor and industries, or by any of its inspectors or agents, and a copy thereof shall be forwarded once a month to said board, as well as such other information as it may require. The label mentioned in this section shall be exhibited on the demand of said board, its inspectors or agents, at any time while said articles or materials remain in the tenement or dwelling house.

SECTION 2. No person operating a manufacturing establishment, or acting as an agent, contractor or subcontractor therefor, shall contract for or give out to be manufactured, altered, repaired or finished in a tenement or dwelling house articles of food or paper frills, napkins, plates, bonbons or skewers which are to be used in connection with food, or any other articles which are to be used in connection with food, or table linen, or handkerchiefs, or tooth brushes, or dolls or articles of dolls' clothing, or toys, or games, or articles of children's or infants' wearing apparel, or materials from which any of the above-mentioned articles, or any part of them, are to be manufactured.

SECTION 3. The term "wearing apparel", as used in this act, and in sections one hundred and six, one hundred and seven and one hundred and eight of chapter five hundred and fourteen of the acts of the year nineteen hundred and nine, shall be held to include all articles, or parts of articles, or ornaments, to be worn, made in whole or in part of paper, of straw, of textiles or of leather. Whoever violates any provision of the two preceding sections shall be punished by a fine of not less than fifty nor more than five hundred dollars.

SECTION 4. For the purpose of enforcing the provisions of section one hundred and six to one hundred and eleven, inclusive, of chapter five hundred and fourteen of the acts of the year nineteen hundred and nine, and for the purpose of enforcing the provisions of this act and other related acts, the state board of labor and industries shall have power to appoint and remove, in conformity with the provisions of section eight of chapter seven hundred and twenty-six of the acts of the year nineteen hundred and twelve, as amended by section eight of chapter eight hundred and thirteen of the acts of the year nineteen hundred and thirteen, six inspectors in addition to the number therein provided.

SECTION 5. For the purposes of this act the state board of labor and industries may expend, annually, out of the treasury of the commonwealth, a sum not to exceed ten thousand dollars.

## AN ACT RELATIVE TO THE PROHIBITED EMPLOYMENT OF MINORS IN BOWLING ALLEYS, THEATRES AND MOTION-PICTURE HOUSES.

Section three of chapter eight hundred and thirty-one of the acts of the year nineteen hundred and thirteen is hereby amended by striking out in the ninth line thereof the word "public", and also inserting in the tenth line, after the words "billiard room", the following words: — nor in theatres and moving-picture houses, — so as to read as follows: — *Section 3.* No minor under sixteen years of age shall be employed or permitted to work in any capacity in adjusting, or assisting in adjusting any hazardous belt to any machinery, or in oiling or cleaning hazardous machinery, or in proximity to any hazardous or unguarded belts, machinery or gearing while such machinery or gearing is in motion; nor on scaffolding; nor in heavy work in the building trades; nor in stripping, assorting, manufacturing or packing tobacco; nor in any tunnel; nor in a bowling alley; nor in a pool or billiard room; nor in theatres and motion-picture houses.

### AN ACT RELATIVE TO THE EMPLOYMENT OF CITIZENS IN PUBLIC WORK.

Section twenty-one of chapter five hundred and fourteen of the acts of the year nineteen hundred and nine, as amended by chapter four hundred and seventy-four of the acts of the year nineteen hundred and fourteen, is hereby further amended by striking out, in the second, third and fourth lines thereof, the words "in the construction of public works by the commonwealth, or by a county, city or town, or by", and inserting in place thereof the following: — engaged in public work for the commonwealth, a county, city or town, or for, — also by adding after the last word in section one, the following: — Whenever it shall appear that any appointive officer has had due notice of unlawful employment of a non-citizen, and that said appointive officer has continued such employment for ten days after such notice, he shall be subject to a fine of not less than ten nor more than one hundred dollars for each offence, — so as to read as follows: — *Section 21.* In the employment of mechanics and laborers engaged in public work for the commonwealth, a county, city or town, or for persons contracting therewith, preference shall be given to citizens of the commonwealth, and, if they cannot be obtained in sufficient numbers, then to citizens of the United States; and every contract for such works shall contain a provision to this effect. The wages for a day's work paid to mechanics employed in such construction of public works shall be not less than the customary and prevailing rate of wages for a day's work in the same trade or occupation in the locality, city or town where such public works are constructed. Any contractor who knowingly and wilfully violates the provisions of this section shall be punished by a fine of not more than one hundred dollars for each offence. Whenever it shall appear that any appointive officer has had due notice of unlawful employment of a non-citizen, and that said appointive officer has continued such employment for ten days after such notice, he shall be subject to a fine of not less than ten nor more than one hundred dollars for each offence.

### AN ACT TO PROVIDE FOR THE WEEKLY PAYMENT OF WAGES TO EMPLOYEES OF FACTORIES.

Section one hundred and twelve of chapter five hundred and fourteen of the acts of the year nineteen hundred and nine, as amended by chapter three hundred and fifty of the acts of the year nineteen hundred and ten, and by chapter two hundred and eight of the acts of the year nineteen hundred and eleven, and by chapter two hundred and forty-seven of the acts of the year nineteen hundred and fourteen, is hereby further amended by inserting the word "hotel", in the second line thereof, directly to precede the word "factory", — so as to read as follows: — *Section 112.* Every person, firm or corporation engaged in carrying on a hotel, factory, workshop, manufacturing, mechanical or mercantile establishment, mine, quarry, railroad or street railway, or a telephone, telegraph, express or water company, or any of the building trades, or the construction or repair of any railroad, street railway, road, bridge, sewer, gas, water or electric light works, pipes or lines, shall pay weekly each employee engaged in his or its business the wages earned by him to within six days of the date of said payment, but any employee leaving his or her employment shall be paid in full on the following regular pay day; and any employee discharged from such employment shall be paid in full on the day of his discharge, or in the city of Boston as soon as the provisions of law requiring pay rolls, bills and accounts to be certified shall have been complied with; and the commonwealth, its officers, boards and commissions shall so pay every mechanic, workman and laborer who is employed by it or them, and every person employed by it or them in any penal or charitable institution, and every county and city shall so pay every employee who is engaged in its business the wages or salary earned by him, unless such mechanic, workman, laborer or employee requests in writing to be paid in a different manner; and every town shall so pay each employee in its business if so required by him; but an employee who is absent from his regular place of labor at a time fixed for payment shall be paid thereafter on demand. The provisions of this section shall not apply to an employee of a co-operative corporation or association if he is a stockholder therein unless he requests such corporation to pay him weekly. The board of railroad commissioners, after a hearing, may exempt any railroad corporation from paying weekly any of its employees if it appears to the board that such employees prefer less frequent payments, and that their interests and the interests of the public will not suffer thereby. No corporation, contractor, person or partnership shall by a special contract with an employee or by any other means exempt himself or itself from the provisions of this and the following section. Whoever violates the provisions of this section shall be punished by a fine of not less than ten nor more than fifty dollars.

## AN ACT RELATIVE TO THE PROSECUTION OF VIOLATIONS OF THE LAW RELATIVE TO THE WEEKLY PAYMENT OF WAGES.

Section one hundred and thirteen of chapter five hundred and fourteen of the acts of the year nineteen hundred and nine is hereby amended by striking out in the fifth line the following, "thirty days", and inserting in place thereof the words: — three months, — so as to read as follows: — *Section 113.* The state board of labor and industries may make a complaint against any person for a violation of the provisions of the preceding section. Complaints for such violation shall be made within three months after the date thereof, and, on the trial, no defence for failure to pay as required, other than the attachment of such wages by the trustee process or a valid assignment thereof or a valid set-off against the same, or the absence of the employee from his regular place of labor at the time of payment, or an actual tender to such employee at the time of payment of the wages so earned by him, shall be valid. The defendant shall not set up as a defence a payment of wages after the bringing of the complaint. An assignment of future wages which are payable weekly under the provisions of this act shall not be valid if made to the person from whom such wages are to become due or to any person on his behalf or if made or procured to be made to another person for the purpose of relieving the employer from the obligation to pay weekly. The word "person" in this section shall include the corporations, contractors, persons and partnerships described in the preceding section.

## AN ACT RELATIVE TO RECEPTACLES FOR EXPECTORATION IN FACTORIES AND WORKSHOPS.

Section one hundred and three of chapter five hundred and fourteen of the acts of the year nineteen hundred and nine is hereby amended by striking out the fifth and sixth lines thereof, as follows: — "The board of health of the city or town in which the factory or workshop is situated", and inserting in place thereof the following: — The state board of labor and industries, — so as to read as follows: — *Section 103.* Suitable receptacles for expectoration shall be provided in all factories and workshops by the proprietors thereof, the same to be of such form and construction and of such number as shall be satisfactory to the state board of labor and industries.

## AN ACT RELATIVE TO THE INSPECTION FORCE OF THE STATE BOARD OF LABOR AND INDUSTRIES.

Section eight of chapter seven hundred and twenty-six of the acts of the year nineteen hundred and twelve, as amended by section eight of chapter eight hundred and thirteen of the acts of the year nineteen hundred and thirteen, and by chapter seventy-four of the general acts of the year nineteen hundred and fifteen, is hereby further amended by striking out in the eighth line thereof the words "twenty-four", and inserting in place thereof the following: — thirty-six, — so as to read as follows: — *Section 8.* The board shall have power to appoint and remove industrial health inspectors, industrial inspectors, assistant industrial inspectors, and necessary clerical assistants, subject to the laws of the commonwealth relating to the appointment and removal of employees in the classified civil service. The total number of industrial health inspectors, industrial inspectors and assistant industrial inspectors shall not exceed thirty-six, of whom at least four shall be women. The state civil service commissioners shall prepare rules, subject to the approval of the governor and council, for including in the classified service all industrial health inspectors, industrial inspectors, assistant industrial inspectors, and clerical assistants. These rules shall provide that candidates for appointments shall pass an examination of a comprehensive and practical character based upon the particular requirements of the kind of work to be done: *provided*, that persons employed at the time when this act takes effect as inspectors of factories and public buildings in the inspection department of the district police and not retained in said department, as provided in section twelve of this act, shall be transferred without such special examination, and without regard to age, to serve as industrial inspectors. Such transfer shall not affect any rights of retirement with pension that shall have accrued at the date when it is made, or would thereafter accrue to an inspector so transferred, but all such rights shall be retained by any inspector as if he had remained a district police officer. Industrial health inspectors shall be persons admitted to practice medicine in this commonwealth, or persons especially qualified by technical education in matters relating to health and sanitation.

Inspectors and assistant inspectors shall be not over forty-five years of age on the date of their first appointment, but this age limit shall not apply to any reappointment, or to the first appointment of any person who filed his application for examination by the civil service commission for such position prior to the first day of January, nineteen hundred and fifteen, and who was not then over forty-five years of age.

Industrial health inspectors, industrial inspectors and assistant industrial inspectors shall devote their entire time to the affairs of the board.

Each inspector shall, before entering upon his duties, be sworn to the faithful performance thereof.

The salaries of the industrial health inspectors, industrial inspectors and assistant industrial inspectors shall be determined by the board with the approval of the governor and council, and shall be graded and of sufficient amount to secure competent men and women for the service: *provided, however,* that the salaries of the industrial inspectors shall be not less than fifteen hundred dollars a year; and *provided, further,* that the amount expended by the board in any year for such salaries shall not exceed the annual appropriation therefor. All salaries provided for under this act shall be paid out of the treasury of the commonwealth.

# APPENDIX E.

## ANALYSES OF INDUSTRIAL DISEASES REPORTED TO THE STATE BOARD OF LABOR AND INDUSTRIES FOR THE YEAR 1915.

Prepared by DR. THOMAS F. HARRINGTON, *Medical Deputy Commissioner.*

| SEX. | Age. | Diagnosis. | Occupation. | Kind of Establishment. | Nature of Work. | Length of Employment. | Symptoms. |
|---|---|---|---|---|---|---|---|
| Male, . . | 35 | Chronic lead poisoning. | General painting. | State Hospital. | Painting. | 5 years. | Loss in weight; acute or chronic arthritis; blue line on gums; dyspepsia; colic; constipation; pulse rate, 76; headache; urine test for lead positive. |
| Male, . . | 23 | Lead poisoning. | Assistant in stock room. | Fire Extinguisher Company. | Gives out supplies to other workmen. Handles pig lead and red lead in powder form. | 8 months. | Colic; diarrhœa; has had attacks for last year and a half. |
| Male, . . | 38 | Plumbism. | Machinist in rubber shops. | Rubber Goods Manufacturing Company. | Handling litharge in considerable amounts daily. | 3 months. | General weakness; loss in weight; blue line on gums; nausea or vomiting; colic; constipation; headache; wrist drop slight. |
| Male, . . | 64 | Plumbism, subacute. | Laborer. | Lead mills. | Dismantling plant. | - - | Pallor; general weakness; loss in weight, about 15 pounds; nausea or vomiting; colic; constipation; disturbance of gait. |
| Male, . . | - | Lead poisoning. | Job painting for himself. | - - | - - - | - - | Pallor; general weakness; loss in weight; nausea or vomiting; colic; constipation; headache; tremor; numbness in hands; stippling in blood. |
| Male, . . | 53 | Lead poisoning. | Paint mixer. | House painting. | Mixing and stirring paints; cleaning shop. | 6 years. | Pallor; general weakness; loss in weight; constipation; diarrhœa; cough; headache; foul taste in mouth; weakness of wrist; numbness of arms and fingers; pains in joints. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | 67 | Acute plumbism. | Laborer. | Lead mills. | Dismantling plant; taking down vats, piping, etc. | 3 months. | General weakness; nausea or vomiting; colic; constipation; disturbance of gait; tremor. |
| Male, . . | 26 | Plumbism. | Painter. | Job painting. | Outside house painting. | 2 weeks. | Blue line on gums; stippling in blood smear. |
| Male, . . | 44 | Plumbism. | Machinist. | Paint factory. | Mixes paint ingredients, thins them down with oil and tints them. | 25 years. | General weakness; mental or emotional disturbance; twitching of fingers and toes; sharp pains in stomach and back. |
| Male, . . | 28 | Plumbism. | Freight handler. | Lead works. | Packing litharge. | 1 year. | Pallor or general weakness; loss in weight; blue line on gums; nausea or vomiting; dyspepsia; colic; constipation; pulse rate, 74; headache; tremor. |
| Male, . . | - | Plumbism. | Retoucher. | Art shop. | Uses air brush which throws spray of white lead, water color. | 1 year. | Constipation; headache, nausea; vomiting; dizziness. |
| Male, . . | 48 | Chronic plumbism. | Painter all his life. | Works for himself. | - - - | - - | Pallor; general weakness; loss in weight; blue line on gums; constipation; pulse rate, 70; vertigo; tremor; basic stippling; urine no albumen (HNO3). |
| Male, . . | 55 | Plumbism. | Painter. | - - | - - - | - - | Intense pain in region of umbilicus; constipation; nausea; loss in weight; pallor; occasional twinges. |
| Male, . . | 31 | Suspected lead poisoning. | Take-off man in electro-galvanizing department. | Steel and wire. | Taking off wire from take-up and bundling same for shipment. | 4 years. | Pallor; general weakness; colic; constipation; neuritis or neuralgia. |
| Male, . . | 45 | Optic neuritis; lead. | Painter. | Contractor painters. | Painting. | 1 year. | Pallor; nausea or vomiting; visual disturbance. |
| Male, . . | 31 | Chronic plumbism. | Painter. | House painting. | Inside and outside painting, mixing, scraping, sandpapering, etc. | 1 year. | Pallor; general weakness; loss in weight; colic; constipation; visual disturbance. |
| Male, . . | 33 | Lead poisoning. | Laborer. | Rubber factory. | Mixer. | 7 months. | Pallor; general weakness; loss in weight; blue line on gums; colic; constipation; stippling in blood smear. |
| Male, . . | 28 | Chronic lead poisoning. | - - | Boiler factory. | Rivets and paints; boilers. | 2 years. | General weakness; blue line on gums; nausea or vomiting; constipation; stippling. |
| Male, . . | 38 | Mild lead poisoning. | Weaver. | Manufacturing cotton. | Weaver. | Long time. | Pallor; general weakness in arms; loss in weight; blue line on gums; constipation; pulse rate normal; headache; vertigo; tinnitus or deafness. |

## ANALYSES OF INDUSTRIAL DISEASES, ETC. — *Continued.*

| SEX. | Age. | Diagnosis. | Occupation. | Kind of Establishment. | Nature of Work. | Length of Employment. | Symptoms. |
|---|---|---|---|---|---|---|---|
| Male, . . | 32 | Lead poisoning. | Painting. | Ship building. | Painting. | 3 years. | General weakness; nausea or vomiting; colic; constipation; headache; tremor. |
| Male, . . | 31 | Plumbism. | Painter. | House painting. | - - - | - - | Blue line on gums; nausea or vomiting; colic; constipation; headache; visual disturbance; stippling in blood smear. |
| Male, . . | 47 | Lead poisoning. | Polisher. | Casket hardware. | Polisher. | 9 months. | Cyanosis; blue line on gums; constipation; cough; headache; vertigo. |
| Male, . . | 26 | Lead poisoning. | - - | Chemical works. | Handling white lead. | 3 months. | Blue line on gums; colic; loss of appetite. |
| Male, . . | 40 | Plumbism. | Laborer. | Lead works. | Laborer. | - - | Pallor; general weakness; blue line on gums; colic; constipation. |
| Male, . . | 24 | Lead poisoning. | - - | Ship building. | Holder-on. | 5 years. | Loss in weight; blue line on gums; blood stippling. |
| Male, . . | 21 | Lead poisoning. | - - | Chemical works. | Arsenate lead worker. | 2 months. | Blue line on gums; nausea or vomiting; dyspepsia; colic; diarrhœa. |
| Female, . | 19 | Skin on finger and thumb ulcerated. | Working on fuses. | Factory, General Electric Company. | Works on spraying machine. Uses brush to varnish. | 4 weeks. | Ulceration of skin on finger and thumb; finger feels numb to first joint. |
| Male, . . | 54 | Lead poisoning. | Painter. | House painter. | Inside work, mixing, scraping, sandpapering. | (Has been painter for 40 years.) | Pallor; general weakness; loss in weight; blue line on gums; nausea or vomiting; colic; constipation; headache; tremor; visual disturbance; numbness of left leg extending into foot. |
| Male, . . | 49 | Lead poisoning. | Painter. | Baby carriage factory. | Sanding wooden-bodied carriages. | - - | Pallor; general weakness; loss in weight; blue line on gums; constipation; stippling in blood. |
| Male, . . | 28 | Lead poisoning. | Mixer. | Rubber factory. | - - - | 3 months. | Pallor; blue line on gums; colic; diarrhœa; headache. |
| Male, . . | 23 | Acute plumbism. | Holder-on. | Ship building. | Holds rivets for air hammers set in lead (?) | 3 months. | Pallor; general weakness; blue line on gums; nausea or vomiting; colic; constipation. |
| Male, . . | - | Lead poisoning. | Mixer. | Rubber factory. | Tends calendar machine. | - - | Nausea or vomiting; pain in right side nearly continuous; stippling in blood cells. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | 27 | Lead poisoning. | Laborer. | Chemical works. | Laborer in hydrate building. | - - | Pallor; general weakness; blue line on gums; dyspepsia; constipation; cough; headache. |
| Male, . . | 28 | Plumbism. | Ship painting. | Ship building. | Working in inside of hold of ships. | 1 year. | Pallor; dyspnœa; headache. |
| Male, . . | 21 | Lead poisoning. | Painter. | Painting. | - - - | 4 months. | Pallor; general weakness; blue line on gums; pain in chest. |
| Male, . . | 45 | Chronic plumbism. | Painter. | Building contractors. | Inside and outside work, mixing, scraping, sandpapering, etc. | 15 years. | General weakness; loss in weight; blue line on gums; constipation; blood smear stippled; nervousness; numbness of arms. |
| Male, . . | 36 | Chronic plumbism. | Painter. | Navy yard. | House and ship painting, inside and out; scraping, mixing, sandpapering, etc. | 11 years. | General weakness; loss in weight; blue line on gums; nausea or vomiting; colic; constipation; headache. |
| Male, . . | 29 | Eczema (?) | Tire machine operator. | Manufacturing auto tires. | Building tires. | 2 years. | Dermatitis; pulse rate, 72; eruption; intense itching. |
| Male, . . | 27 | Lead poisoning. | - - | Chemical works. | Shovels and fills barrels with arsenate of lead. | - - | Pallor; blue line on gums; colic; constipation; diarrhœa; headache. |
| Male, . . | 50 | Chronic lead poisoning. | Yard hand; worked short time, construction of new boiler room. | Cartridge factory. | - - - | Off and on 12 years. | Pallor; dermatitis; headache; ulceration of skin; blue line on gums; pulse rate increased; disturbance of gait; neuritis or neuralgia; paralysis of muscles; roof of mouth hard; palate is bluish red color; bacteriological examination negative; metallic odor to breath. |
| Male, . . | 45 | Lead poisoning. | Painter. | Painters and paper hangers. | Painter. | 7 years. | Blue line on gums; nausea or vomiting; colic; constipation; pulse rate, 72; furred tongue; foul breath. |
| Male, . . | 38 | Lead poisoning. | - - | Chemical works. | Handles arsenate of lead. | - - | Pallor; blue line on gums; nausea or vomiting; colic; constipation. |
| Male, . . | 39 | Lead neuritis. | Painter. | Motor Car Company. | Automobile painting. | All his life. | Blue line on gums; palpitation; disturbance of gait; neuritis or neuralgia; wrist drop slight; paralysis of muscles; pain in ankles, knees, back; inability to get out of bed; weakness of hand grip, especially right. |
| Male, . . | - | Lead poisoning. | - - | Auto supply factory. | Works with compressed air sprayer spraying paint with lead basis on parts of automobile. | - - | Loss in weight; colic; constipation; headache. |
| Male, . . | 40 | Lead poisoning. | Painter. | Inside and outside painting. | Painting, sandpapering, scraping, etc. | - - | Pallor; general weakness; loss in weight; constipation. |

ANALYSES OF INDUSTRIAL DISEASES, ETC. — *Continued.*

| SEX. | Age. | Diagnosis. | Occupation. | Kind of Establishment. | Nature of Work. | Length of Employment. | Symptoms. |
|---|---|---|---|---|---|---|---|
| Male, . . | - | Lead poisoning. | Painter. | House painters. | Painting, sandpapering, scraping, etc. | - - | Colic; constipation; vertigo; stippling in blood smear. |
| Male, . . | 40 | Plumbism. | Grinder. | Lead factory. | Shovels powdered lead into grinding machine. | 2 months. | Pallor; loss in weight; blue line on gums; colic; constipation; tremor; visual disturbance. |
| Male, . . | 30 | Chronic plumbism. | Furnace hand. | American Tube Works. | No lead hazard here; has previously worked in lead factory and as weigher in rubber factory. | - - | Pallor; general weakness; loss in weight; nausea or vomiting; headache. |
| Male, . . | - | Lead poisoning. | Painter. | Worked for himself; paint shop. | Mostly inside work. | - - | Pallor; nausea or vomiting; headache; paralysis of muscles; spasmodic tic, right side of face. |
| Male, . . | 31 | Plumbism. | Painter. | Paint shops. | House painting, scraping, sandpapering, etc. | - - | Blue line on gums; constipation. |
| Male, . . | 38 | Lead poisoning. | Painter. | Sampson Electric Company (sort of paint shop in basement). | Painting fire-alarm boxes by means of spray. | - - | Pallor; skin manifestations; general weakness; acute or chronic arthritis; blue line on gums (stippling in blood smear). |
| Male, . . | 45 | Lead colic. | Painter. | General contractors. | Inside work, painting, sandpapering, etc. | Painter for 26 years. | General weakness; slight; blue line on gums; nausea or vomiting; colic; constipation; pulse rate, 100; salivation. |
| Male, . . | 31 | Suspected lead poisoning. | Reel man in patenting room. | Steel and wire. | Puts wire on reel and connects ends of wire together. | 3 years. | Pallor; dermatitis; general weakness; colic; constipation; neuritis or neuralgia. |
| Male, . . | 30 | Chronic lead poisoning. | Painter. | Works for himself. | - - - | - - | Constipation; no definite colic, but pain in epigastrium; stippling in blood smear. |
| Male, . . | 36 | Lead colic. | Spraying trees. | Farm. | Spraying trees once weekly. | - - | Blue line on gums; nausea or vomiting; colic; constipation; headache. |
| Male, . . | 32 | Lead poisoning. | Laborer. | Smelting works. | Lead smelting and pouring. | 6 years. | Pallor; general weakness of right arm; blue line on gums; tremor; wrist drop; paralysis of muscles; marked stippling. |
| Male, . . | 33 | Lead poisoning. | Painter. | Worked for himself. | House painting. | 20 years. | Loss in weight; blue line on gums; colic; constipation; headache; stippling in blood smear. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | 28 | Chronic plumbism. | Press feeder. | Printing establishment. | Fed paper into press. | 13 years. | Pallor; blue line on gums; nausea or vomiting; colic; dyspepsia; constipation; has attacks of lead colic about twice a year. |
| Male, . . | 29 | Lead poisoning. | Laborer. | Rubber goods Manufacturing Company. | Mixing compounds, including litharge with rubber. | 1 year. | Pallor; general weakness; loss in weight; blue line on gums; colic; dyspepsia; constipation; pulse rate, 80; headache; stippling in blood smear. |
| Male, . . | 24 | Chronic lead poisoning. | House painting. | – – | Inside and outside painting, mixing, scraping, sandpapering, etc. | 4 years. | Pallor; blue line on gums; constipation; pain in stomach; stippling in blood smear. |
| Male, . . | – | Lead poisoning. | – – | Wood turning shop. | – – – | – – | No certificate of industrial disease received. Reported by physician treating man. |
| Male, . . | 31 | Plumbism. | Mixer. | Rubber factory. | Operates milling machine. | 1 year. | Pallor; general weakness; blue line on gums; cough; dyspnœa; stippling in blood smear; other symptoms having to do with pleurisy. |
| Male, . . | 49 | Lead poisoning. | Painter. | – – | – – – | – – | – – – |
| Male, . . | 34 | Plumbism; myocardial weakness. | Painter. | – – | Painter. | 22 years. | Pallor; loss in weight; blue line on gums; constipation; headache; intermittent pain in right quadrant, upper. |
| Male, . . | 24 | Lead poisoning. | – – | – – | – – – | – – | – – – |
| Male, . . | 46 | Plumbism. | Painter. | House painting. | Inside and outside work, mixing, sandpapering, scraping, etc. | 30 years. | Pallor; blue line on gums; colic; constipation; headache. |
| Male, . . | 39 | Acute plumbism. | Painter. | Paint shop. | Outdoor painting; in bad weather paints blinds in shop. | – – | Ulcerations of skin; slight general weakness; blue line on gums; nausea; colic; constipation; mental condition marked by indefinite rather than lost memory, possibly due to careless mental habit rather than poison. |
| Male, . .. | 51 | Eye; muscular paralysis and possibly neuritis. | Painter. | – – | House painting. | 35 years. | Double vision; pains in muscles in back of eye and in side and back of head. |

## CASES OF CAISSON DISEASES.

| SEX. | Age. | Diagnosis. | Occupation. | Kind of Establishment. | Nature of Work. | Length of Employment. | Symptoms. |
|---|---|---|---|---|---|---|---|
| Male, . . | 29 | Caisson disease. | Mixer (concrete). | Contracting company. | Mixing concrete. | Less than 1 month. | Vertigo; tinnitus or deafness. |
| Male, . . | 33 | Bronchial asthma. | Worked under compressed air. | Contracting company. | Excavation of tunnel; waterproofing; compressed air. | 6 months. | Pallor; general weakness; loss in weight; cough; dyspnœa. |
| Male, . . | 31 | - - | Lock tender. | Contracting company. | Building tunnel. | Less than 1 month. | Headache; tinnitus or deafness. |
| Male, . . | 33 | Caisson disease. | Worked under compressed air. | Contracting company. | Building tunnel. | Less than 1 month. | Pallor; general weakness; acute or chronic arthritis; nausea or vomiting; diarrhœa; headache; neuritis or neuralgia; both knees affected, requiring morphine; mild case, recovery in 7 days. |
| Male, . . | 27 | Caisson disease. | Worked under compressed air. | Contracting company. | Worked under 20 pounds, pressure of compressed air. | - - | Pallor; headache; neuritis or neuralgia; mental or emotional disturbance; pain, elbows and knees; has had many previous attacks. |
| Male, . . | 27 | Caisson disease. | Carpenter. | Contracting company. | Worked under compressed air. | - - | Pulse rate, 98; pain, tenderness and cramp in left arm and forearm; numbness in fingers of left hand. |
| Male, . . | - | Caisson disease; myalgia. | Worked under compressed air. | Contracting company. | Worked under about 15 pounds' pressure. | - - | - - - |
| Male, . . | - | Caisson disease; myalgia. | Worked under compressed air. | Contractors. | Building of tunnel. | About 3 weeks. | - - - |
| Male, . . | - | Caisson disease; myalgia. | Worked under compressed air. | Contractors. | Building of tunnel. | About 3 weeks. | - - - |
| Male, . . | - | Caisson disease; myalgia. | - - | Contractors. | Building of tunnel. | About 3 weeks. | - - - |
| Male, . . | 37 | Caisson disease. | - - | Boston Elevated Company. | Construction of subway. | - - | Not given. Transitory trouble, patient no longer engaged in work. |
| Male, . . | 37 | Caisson disease. | Worked under compressed air. | Contracting company. | Construction of subway. | About 1 month. | Pallor; general weakness; nausea; cough; dyspnœa; vertigo; ataxia; disturbance of gait; especial symptom, dizziness. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | - | Myalgia. | Foreman, concrete work. | Contracting company. | Construction of tunnel. | 1 month. | Pain in left knee. |
| Male, . . | - | Myalgia. | Laborer under compressed air. | Contracting company. | Construction of tunnel. | 1 day. | Pain about knees. |
| Male, . . | - | (?) | Holds compressed air drill. | Car shops. | Air hammer. | - | Pallor; general weakness; loss in weight; cough; concavity of seventh, eighth and ninth ribs. |

## CASES OF CIGAR NEUROSIS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | 45 | Cigar neurosis. | Cigar maker. | Cigar manufacturing. | Cigar making. | 29 years. | Severe pains in left arm and especially shoulder. |
| Male, . . | - | Cigar neurosis. | Cigar maker. | Cigar manufacturing. | Cigar making. | 6 years. | Disturbance of gait; neuritis of left foot and leg; irregular temperature between 100 and 101; pain in left arm. |
| Male, . . | 55 | Cigar neurosis. | Cigar maker. | Cigar manufacturing. | Cigar making. | 4 years. | Neuritis in right arm running from finger tips to shoulder. |

## CASES OF GAS POISONING.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | - | Gas poisoning. | Chemist. | Chemical works. | - | - | Found dead on road leading from factory. |
| Male, . . | - | Gas poisoning. | Carpenter. | Chemical works. | Worked in picric acid plant on platforms on ladder under exhaust fans. | About 1 week. | Vomiting; cough; vertigo. |
| Male, . . | 40 | Gas poisoning. | - | Chemical works. | Mixing and working over products. | About 1 month. | Pallor; general weakness; loss in weight; nausea or vomiting; cough; headache; dyspnœa; vertigo. |
| Male, . . | - | Gas poisoning. | - | Chemical works. | Working over mixing tank. | About 1 month. | General weakness; nausea or vomiting; vertigo; dyspepsia; cough. |
| Male, . . | 40 | Gas poisoning. | - | Chemical works. | Working over pipes and tanks. | About 3 weeks. | Pallor; general weakness; nausea or vomiting; cough; headache. |
| Male, . . | 24 | Gas poisoning. | - | Chemical works | Mixing acids. | 15 or 20 days. | Pallor; general weakness; loss in weight; nausea or vomiting; dyspepsia; cough; headache; vertigo. |
| Male, . . | 39 | Gas poisoning. | - | Printing company (dyes). | Worked in room where cloth passed through dyes. | - | No certificate received. Reported by physician attending. |

### CASES OF GAS POISONING — *Concluded.*

| SEX. | Age. | Diagnosis. | Occupation. | Kind of Establishment. | Nature of Work. | Length of Employment. | Symptoms. |
|---|---|---|---|---|---|---|---|
| Male, . . | 44 | Gas poisoning. | Carpenter. | Chemical works. | Carpenter work in and about building. | 3 weeks. | Pallor; general weakness; nausea or vomiting; cough; dyspepsia; pulse rate, weak; headache; vertigo; death. |
| Male, . . | 25 | Gas poisoning. | Superintendent of picric acid plant. | Chemical works. | - - - | - - | Pallor; cyanosis; general weakness; loss in weight; nausea or vomiting; pulse rate, weak; palpitation; headache; vertigo. |
| Male, . . | 35 | Chronic gas poisoning. | General work. | Chemical works. | - - - | - - | Pallor; loss in weight; blue line on gums; pulse rate, 70; poor blood test; looks poorly. |
| Male, . . | 24 | Gas poisoning. | Mixer. | Chemical works. | Mixing materials in tanks. | - - | Pallor; cyanosis; general weakness; cough; pulse rate, poor; dyspnœa; vertigo. |
| Male, . . | 25 | Gas poisoning. | Machinist. | Chemical works. | Working on piping, etc. | 6 weeks. | Cyanosis; general weakness; pulse rate, 90; dyspnœa; vertigo; suddenly overcome by fumes; unconscious. |
| Male, . . | 26 | Gas poisoning. | - - | Chemical works. | Working around pipes, tanks, etc. | 3 months. | Pallor; dermatitis; general weakness; loss in weight; nausea or vomiting; cough; palpitation; headache; vertigo; blood poor. |
| Male, . . | 35 | Gas poisoning. (Irritation of kidneys from fumes of acids.) | Metal stripper. | Removes plate or enamel from auto lamps. | Dips lamps in acids; also potash. | - - | Pallor; dermatitis; general weakness; dyspepsia; palpitation of heart, 120; headache; vertigo; ataxia; disturbance of gait; visual disturbance; conjunctivitis; cough; taste of acid in mouth; dark bowel movements which have the odor of dead rats; blood pressure, 180 millimeters; œdema of lower eyelids. |

## CASES OF DERMATITIS.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Male, . . | 39 | Dermatitis (septicæmia resulting from pemphigus). | Meat cutter and salesman. | Wholesale meat and produce. | – – – | 1 year. | Pallor; dermatitis: other eruptions; ulcerations of skin; general weakness; loss in weight; acute or chronic arthritis; constipation; headache; arthritis and cellulitis of right knee and thigh. |
| Male, . . | 53 | Dermatitis. | Shoemaker. | Shoe factory. | Treeing. | 2 years. | Dermatitis; rather severe dermatitis of hands (palms and backs). |
| Female, . | 27 | Acute dermatitis. | Dressing shoes. | Shoe factory. | Dressing patent leather tips. | – – | Acute dermatitis of hands. |
| Male, . . | 18 | Dermatitis. | – – | Button factory. | Taking stock out of chemical solution. | 1 year. | – – – |
| Female, . | – | Ulcer, knee. | Cutter on machine. | – – | – – – | – – | No certificate. Reported by letter from physician. Knee painful and swollen; part of knee coming in contact with press thick, black and had hard area sloughed off leaving ugly deep ulcer. |
| Male, . . | 17 | Dermatitis. | Nail sticker. | Shoe factory. | Places unpolished nails in steel form, and when form turns on pivot nails are driven into heel. | – – | Fingers considerably cut. |
| Male, . . | 58 | Tuberculosis; verrucosa. | Trained nurse. | Hospital. | – – – | – – | Dermatitis; ulceration of skin. |
| Male, . . | 42 | Conjunctivitis. | Switch tender. | Street Railway Company. | Electric welding machine. | – – | Eyes congested and painful; difficulty in distinguishing objects. |
| Male, . . | 38 | Localized myositis. | Irons shoes. | Shoe factory. | – – – | 8 years. | Pain and weakness in the acts of pronation and supination of right hand, and in acts of flexion and extension of fingers. |

## CAISSON DISEASE.

All the cases of caisson disease reported during the year have been in connection with the tunnel construction now going on in Boston. The symptoms varied from vertigo and tinnitus to convulsions. In several cases "bends" are included in the list.

## CIGAR NEUROSIS.

Three cases of occupational disease among workers were reported during the year.

These employees have been engaged in cigar making four, six and twenty-nine years, respectively. Each had typical kinds of occupational neuritis of hands, arms and fingers. In one case the excessive humidity of the establishment — a factor more or less common in all cigar-making establishments — was alleged to have aggravated the neurosis.

## GAS POISONING.

The principal causes of gas poisoning as reported during the year related to poisoning from nitro and amido derivatives of benzene in the manufacture of munition gases.

This poisoning has been considered in detail in an earlier part of this report.

A man engaged in the dipping of automobile lamps into a solution of nitric and sulphuric acid, in order to remove enamel and paint, was overcome by fumes. There was no method of gas removing employed at this establishment, and the man suffered severely also from dermatitis of the scalp, feet and body. He also had a cough, fetid expectoration and suppression of the urine.

## DERMATITIS.

The cases of dermatitis are among workers in the shoe industry, usually resulting from handling wood alcohol preparations or naphtha.

One case of dermatitis reported, however, is of unusual interest, — a young woman operating a sewing machine by means of a lever on the machine, to which was attached an oval piece of steel which lifts the foot press by pressing the knee against this pad. A severe ulceration of the outer part of the right knee resulted, which sloughed, leaving a deep ulceration.

Further causes of irritation by this machine might be obviated by padding the projection against which the knee pressed in manipulating the machine.

## Eye Diseases.

The question of industrial eye diseases is one of great interest. The only case reported during the year was that of a man using an electric welding machine on street railway construction, who reported having difficulty in distinguishing objects because of the use of this machine.

Several cases of slight poisoning by methyl or wood alcohol, by which vision has been disturbed, have come to our notice during the year. Also complaint concerning exposure to bright light in foundries, electric welding, steel smelting, etc. Much of the recent investigation concerning eye diseases from the foregoing occupations would seem to indicate that the injury to vision and to the eye is caused by excessive heat rather than excessive light. Few, if any, of the industries calling for exposure to intense heat and light are without suitable goggles for the protection of employees. Here, however, the difficulty often seems to be to secure the co-operation of the employees in using such protection. The danger from causes other than flying particles of steel, stone, wood, leather, etc., in causing injury to eyes is not generally appreciated by workers. Neither is the element of fatigue of the eye muscles sufficiently understood among the great group of workers whose continuous use of the eyes makes fatigue and eye strain very important factors in causing disease. Perfect co-ordination between the two eyes is accomplished by the action of fourteen separate muscles. Four of the twelve cardinal nerves are devoted exclusively to vision. Much of the muscular fatigue due to close work is due to the disarrangement of this power of co-ordination, and the result is a neurasthenia or general nervous debility.

## Lead Poisoning.

This is by far one of the most common of the industrial poisonings. It occurs in a great variety of occupations, among the more prominent of which are the following: —

(*a*) Painting, varnishing and sanding of automobiles, cars, carriages, furniture, safes, vaults, boats, ships, etc.

(*b*) House painting, sign painting, soldering.

(*c*) Brass and bronze founding, soldering and polishing.

(*d*) Cutlery and tool tempering.

(*e*) Electric apparatus, especially in the manufacture and charging of storage batteries, lead burning and soldering.

(*f*) Enameling and Japanning of ironware, pottery and leather.

(*g*) Pottery, tile, porcelain and sanitary ware, glazing and decorating.

(*h*) Lead and zinc smelting and ore refining.

(*i*) Paint and varnish manufacturing.

(*j*) Type founding, type setting, monotyping and linotyping.

(*k*) Rubber manufacturing.

(*l*) Electrotype casting.

(*m*) Wire galvanizing.

(*n*) Glass manufacture, lead and putty making.

(*o*) Dyeing and making of artificial flowers, leaves, jewelry, clothing, etc.

This poison is the most easily preventable of the occupational diseases. Prevention requires two things only —

1. Cleanliness.
2. Less careless habits on the part of those working with lead.

Poisoning occurs in two ways, — by swallowing the poison by breathing lead dust (the greater part of which is swallowed) and by lead fumes. Authorities agree to-day that the presence of lead in the urine is the most reliable test of lead poisoning. This usually, however, has other signs, such as a blue line on the gums, as well as a more or less suspicious history suggesting lead poisoning.

The following cases taken from those reported during the year will show the diversity of occupations in which lead poisoning has occurred: —

1. Male, aged sixty-nine years, worked at cementing rubber goods, hose, etc., for the past twenty-seven years. In 1912 began to fail, and complained of constipation, headache, vertigo, tremor, neuritis, nausea and pain in muscles of arms, back and legs. Examination in August, 1914, showed pallor, a rapid, bounding pulse, loss of power of muscles of arms and legs, vertigo and lead in blood and urine. No blue line on gums.

2. Male, aged thirty-six years, began work in May, 1915, as sandpaperer of primed wood. On July 10 was attacked with vomiting, colic, headache, vertigo, tremor, neuralgia, general weakness and inability to continue work. Examination showed a marked loss in weight, blue line on gums, lead in urine. This man had worked as painter twenty-five years ago.

3. Male, aged forty years. A master painter doing odd jobs for the past two years. Has been in ill health ever since. Has felt weak and tired. Six months ago began to have pains in abdomen with constipation, headache, nausea and general weakness, with loss of weight; also numbness of the hands, and tremor. Examination showed lead in urine and in the blood.

4. Male, aged fifty-two years, worked for twenty-eight years as molder in handling iron castings. Later has done the "facing" with powdered lead, and has since complained of headache, vertigo, general weakness, loss of weight, constipation, with diarrhœa, nausea and colic. Examination showed pallor and great weakness, unsteady gait in walking, blue line on gums, and lead in the blood and in the urine.

5. Male, aged sixty-seven years, started work May 18, 1915, to dismantle an old lead works and to remove the machinery. On May 27 was attacked with nausea, dizziness, vertigo, constipation, colic, tremor, disturbance of gait and general weakness. He was able to work five days in the first week; two days in the second week; three days in the third week. In each case had to stop on account of cramps and colic. The examination showed lead in urine.

6. Male, aged thirty-one years, worked at electro-galvanizing on wire for the past four years. Early in 1915 he began to lose weight, have headaches and colic with constipation, nausea and general weakness. No blue line on gums. Examination showed lead (May 27, 1915).

7. Male, aged twenty-one years, has worked six years in tin can factory soldering bottoms on tin cans. Two months ago complained of headache, dizziness, loss of weight and general weakness; also loss of power in hands. Examination showed lead in urine and in blood.

8. Male, aged sixty-four years, worked as painter for forty years. Had no trouble up to nine weeks ago, when he complained of dizziness, headache, tremor, disturbance of vision, numbness of left leg and foot, colic, constipation, nausea, loss of weight and general weakness. Examination showed pallor, a marked loss of weight, blue line on gums, lead in blood and urine.

9. Male, aged thirty-nine years, worked as painter for past twelve years. In May, 1904, had lead neuritis. In March, 1915, began work sandpapering and painting automobiles. Was compelled to give up work in April, 1915, because of pains in knees and back; inability to get out of bed and weakness of right hand. Examination showed palpitation and irregularity of the heart, paralysis of the muscles of the wrist, arms and hand, and wrist drop, disturbance of the gait, neuritis of the arms and legs and lead in urine.

10. Male, aged forty years, worked in lead factory for past five years. Two months ago was put on work shoveling powdered lead into a grinding machine. Five weeks ago was taken ill with constipation and colic, and three days ago had a similar attack. Examination showed pallor, loss of weight, tremor of hands, disturbance of sight, a marked blue line on gums and lead in blood and urine.

11. Male, aged thirty-six years, worked for six years in a smelting and refining establishment as sorter of old junk lead. One year ago he was treated at the hospital for lead poisoning. Eight weeks ago he gave up work on account of general weakness. Examination showed pallor, loss of power of arms, tremor, wrist drop, paralysis of the muscles of the arms, marked blue line on the gums and lead in blood and urine.

12. Male, aged twenty-six years, worked as house painter for ten years. About seven years ago began to have headaches, constipation and general weakness. Two months later had disturbance of gait, tremor, wrist drop, paralysis of the arms and general weakness. Had not been able to work since December, 1913. Examination showed marked blue line on the gums and lead in urine and in the blood.

13. Male, aged fifty-three years, has been paint mixer for twenty-five years. Had lead poisoning ten years ago. About ten days ago complained of foul taste in the mouth, weakness of the wrist, numbness of the arms and fingers, pains in the joints of the arms, hands and legs, headache, nausea, constipation, diarrhœa and much cough. Examination showed pallor, marked loss of weight, marked defection of the lungs, paralysis of the muscles of the arms and legs and lead in blood and in urine.

14. Male, aged forty-one years. Glazier since 1890. Had an attack of constipation and colic in February, 1914; an attack of "rheumatism" in February and March, 1914; also in May and June, 1914. Examination in September, 1914, showed pallor, vertigo, general weakness, loss of weight, lame joints, blue line on gums and lead in blood and in urine.

15. Male, aged thirty-six years, engaged in spraying trees with lead compound, was taken ill with nausea and colic, constipation and headache, and on examination was found to have a blue line on gums and lead in the blood. Had never worked under other lead hazards.

16. Male, fifty-six years of age, a painter, complained for several weeks of general debility and pain in the region of the umbilicus. Was much constipated, nauseated and experienced great loss of strength. Examination of the blood showed hæmoglobin, 50 per cent., blue line present on gums, pain in abdomen increased, and on admission to hospial was in coma, during which he died.

17. Male, aged forty-five years, house painter and paper hanger during a period of seven years. On entrance to the hospital he complained of pain in the stomach. Had periods of unconsciousness during the night. When conscious did not recognize any one. Had no convulsions, some delirium, no wrist drop. Pupils equal, small, reacted to light slowly. Neck stiff, pulse small, lead line on gums, knee jerk not obtained. Fluid from lumbar puncture slightly bloody. Wassermann reaction negative. Blood smear showed basic stippling. The patient died the morning after entrance to the hospital. Diagnosis: chronic lead poisoning; lead encephalopathy.

The foregoing cases illustrate many points of interest in lead poisoning. They show that persons vary in susceptibility to lead poisoning, and that a person who has worked on lead for many years is not immune to an attack when he becomes debilitated or tired out; also that lead poisoning varies in its symptoms from simple debility and muscular weakness to convulsions, coma and death. Undoubtedly many cases of lead poisoning are overlooked because the daily dose of the poison received is not sufficient to cause colic or paralysis or severe constipation, nor sufficient to produce a lead line on the gums.

Simple rules of prevention — that care be taken that lead dust or fumes do not enter the system — will reduce the hazard to a minimum.

This department has endeavored throughout the year to have adopted at various establishments where the lead is used the following simple rules and regulations: —

1. Proper heating, lighting, humidity and ventilation of workshops.
2. Proper appliances for the removal of dust, gases and fumes incidental to the industry.
3. Hot and cold water, soap and nail brushes, for washing purposes, and drinking water not exposed to lead contaminations.
4. Lunch rooms, lockers and toilet rooms *outside* of the workroom.
5. Strict prohibition against luncheon eating and against dry sweeping in workroom.
6. Immediate notification by foreman, forewoman or master workman of every case of illness among the workers, especially pains in the stomach, continued headache, dizziness, weakness in arms, legs and body.
7. Gloves or respirators to be provided in white lead dry scraping, grinding or mixing, as well as in the handling of white lead mixtures.
8. Request foreman, forewoman or master workman to see that these instructions are given to all new workers, to all illiterates and to those who do not understand the English language.

## BRASS POISONING.

The only case of brass poisoning coming to our notice during the year was the following: —

A male, twenty-seven years of age, employed as a bronze duster at a paper manufacturing plant. The bronzing machines on which this man worked were not properly hooded, and considerable fine dust was evidenced. The symptoms were pallor, visual and mental disturbances, mucus and blood in stools, pain in back and in joints. Diagnosis at the hospital was bronze poisoning.

### Wood Alcohol Poisoning.

The only serious case of wood alcohol poisoning during the year was that of acute dermatitis of the hands of a girl employed in dressing patent leather tips. Many employees, especially in the shoe industries, have substituted a liquid preparation composed of ethyl acetate, acetone and water in place of the previous mixtures composed of equal parts of denatured alcohol and commercial acetone, to which have been added small quantities of amyl acetate and oil of citronella. While it is difficult to see how serious effects could be produced by the amount of wood alcohol present in many of the former preparations used, nevertheless the psychological effect produced by the continuous odor of the wood alcohol preparations did much to disturb the contentment of the employees, and not infrequently gave rise to the belief that the occupation followed had a greater hazard than really existed. Many of the shoe and leather factories have provided hoods for the removal of the odors of acetone and alcohol.

### Anthrax Poisoning.

Three cases of anthrax poisoning have been brought to our attention during the year.

A male, thirty-one years of age, employed on the dock handling and weighing hides taken from a ship, showed evidences of skin irritation accompanied by intense headache and fever. Besides handling the hides, his duties consisted of clerical work and adjusting the weights on the scales weighing the hides. He had been employed at this work about one month. The hides were principally Australian calf skins and South American hides. The first evidence of infection was a boil on the left forearm at the elbow. This grew worse rapidly, and he became so ill that he was sent to the hospital, where a diagnosis of anthrax was made.

A male, nineteen years of age, in the United States one month, engaged in handling hides in a tannery, became ill and showed evidences of glandular enlargement in the neck. The smear from the ulcerated gland showed the presence of anthrax bacilli.

A third case was brought to our attention through a newspaper report that a man carrying hides at one of the wharves at East Boston had died from arsenic poisoning due to handling the hides. (Man was fifty years old.) Investigation at the hospital showed that on July 4 the man entered the condition moribund. He died that night. Diagnosis: œdema of the lungs, multiple contusions and abrasions. An autopsy showed that the man died from internal anthrax. An investigation further revealed the fact that on May 25 the man worked in the hold of a vessel laden with dried blood, ground bones and phosphate, and subsequent to that date assisted in discharging cargoes of dried hides.

In investigating the origin and course of these three cases, the following information was obtained: —

That the United States laws require that arsenic cured or sun dried hides do not need to be disinfected, but if the hides are not arsenic cured or sun dried, disinfection by one of the following methods is necessary: —

(*a*) Soaking in $\frac{1}{1000}$ bichloride of mercury solution for thirty minutes.

(*b*) Immersion in 5 per cent. phenol.

(*c*) Dried with the fumes of dioxide of sulphur, 4 pounds of sulphur to every 1,000 cubic feet of air space, the hides being suspended and separated in a close room and subjected to the sulphur fumes for six hours.

The United States consuls in foreign ports have to give a certificate of disinfection and O. K. the invoice of shipment. Where anthrax is prevalent, a thirty-minute immersion in $\frac{1}{1000}$ bichloride solution is the only disinfection accepted. Hides are not supposed to be landed in this country unless a certificate from the consul is obtained from the captain of the ship. If at any time a captain has not the certificate, but the customs officials feel that it will come on the next mail boat, the Inspector of Animal Industry under the Department of Agriculture allows the hides to be landed, and takes charge of them. Shipments of hides from State to State within the United States receive practically no consideration as to disinfection.

In view of the importance of this subject and the possibility of being a source of occupational disease, definite instructions should be issued covering the dangers of handling hides, wool, horse hair and similar material, in order that employees handling such hides, leather and wool, and those engaged in brush making, should be warned of the possible danger through anthrax.

## APPENDIX F.

## REPORT OF DR. M. VICTOR SAFFORD ON EXAMINATION OF MINORS.

Mr. EDWIN MULREADY, *Commissioner of Labor, 1 Beacon Street, Boston, Mass.*

SIR: — Under date of Jan. 27, 1915, the undersigned received instructions from the Surgeon-General of the United States Public Health Service, which read as follows: —

> In accordance with requests contained in correspondence received from the Massachusetts Child Labor Committee and the State Board of Labor and Industries, you are hereby detailed to co-operate with these agencies in studies of the influence of occupations on persons during the period of adolescence, with view to standardizing methods of oversight of such persons to protect their health in the industries.

The correspondence mentioned in the foregoing of the Massachusetts Child Labor Committee with the Surgeon-General had referred to the need of intelligent effort to determine the physical fitness of children to enter occupations. At a conference at Boston, which preceded and gave rise to this correspondence, the broader subject of selection of vocation had also been discussed.

After the receipt by the undersigned of his official instructions quoted, there followed several conferences in which representatives of the Massachusetts Child Labor Committee, yourself and other representatives of the State Board of Labor and Industries, and the undersigned took part. In attempting to formulate some practicable form of procedure we were confronted by these facts.

An essential to an intelligent decision as to the fitness of children to enter an occupation is a clear knowledge of what the occupation actually requires and trustworthy information regarding its effect upon those actually engaged in it. There are occupations which are recognized as harmful or hazardous. Practically every occupation that has been so recognized as harmful or hazardous for a young person has been enumerated in chapter 831 of the Acts of 1913, and the employment of "minors" in any of them has been specifically prohibited.

Regarding probable effects upon children of the great majority of occupations they are likely to enter little definite, trustworthy information is available, and what may pass for information regarding such occupations will often prove on critical analysis to be based largely on guesswork.

The present State law places the determination of the physical fitness of the child to enter an occupation in the hands of a legally authorized physician selected by a local school committee, and makes the decision of this physician practically final as to such fitness. No State agency possesses any legal power to veto the decision of such a physician or to prescribe the scope of his physical examinations or even to review his actual examination work except through the provision of law referred to below, requiring an inspector of the State Board of Labor and Industries to inform himself as to the condition of the health of the "minors" employed in his district.

In view of these facts it was decided that the first requisite for any plan of action in the further interest of child labor in this State was better information regarding the effect on persons already employed therein of those occupations which the State laws permit children to enter. The laws of Massachusetts give no State officials the authority to subject people to examinations, physical or otherwise, for the mere purpose of determining possible effects of their occupations upon them, except in so far as such power is implied in a provision of law (chapter 537, section 3, Acts of 1907) which, as amended, now reads as follows: —

> Every inspector of the state board of labor and industries shall inform himself concerning the health of all minors employed in all factories within his district, and, whenever he may deem it advisable or necessary he shall call the ill-health or physical unfitness of any minor to the attention of his or her parents or employers and to the state board of labor and industries.

It was accordingly decided to utilize the legal authority just quoted to begin an investigation, as comprehensive as possible, with view to determining the physical fitness of minors to engage in the industries in which they might be found employed, and to discovering any possible effects of their occupations upon their health or physical development. As the term minor is defined by Massachusetts law as "a person under eighteen years of age," the investigation was necessarily restricted, so far as routine physical examinations are concerned, to persons under eighteen, or, in other words, to persons who at the longest have been working at an occupation less than four years.

The cotton manufacturing industry of the State was selected as the first field for investigation, both on account of the large proportion of minors which this industry employs, and because of the public attention which has been directed to their employment in this industry. At the time the plan was formulated the position of the medical deputy commissioner of labor was vacant, and with the expectation from week to week that a selection would be made to fill this position, the beginning of actual field investigation was postponed from time to time in order that a medical deputy commissioner of labor might be given an opportunity to have a voice in the details of the program.

In May, however, it was decided to wait no longer on this account, and the field investigation, including the physical examinations of minors at work in the cotton mills, was begun. As for certain reasons in this investigation it was deemed inadvisable to have physical examinations of female minors made by any one except female physicians, and as these were not available, it was found necessary to abandon for the time being the plan of including female minors in the physical examinations. The progress of the investigation was repeatedly interrupted by unexpected emergencies which required me to give my entire time to other official duties.

What is deemed as comprehensive a preliminary survey as is called for has, however, now been made of the cotton manufacturing industry of this State so far as male minors are concerned, and the findings are set forth in this report.

In making this investigation I have been fortunate in the selection by yourself and your Board of the assistants furnished me. Dr. Eugene J. McCarthy, the medical inspector of the Board, who has taken part in all the physical examinations, has brought to bear on this work a wide professional experience, clear judgment and a technical knowledge of the industry and its working conditions. Mr. O'Neil, who was furnished as a medical clerk, has had an exceptional experience in medical examinations, and to him the credit is largely due that in making these examinations no complaints have arisen from a mill management or from employees taken off "piecework."

## REPORT.

Every cotton manufacturing center of the State has been covered by the field work. Six hundred and seventy-nine boys between the ages of fourteen and eighteen have been subjected to as careful physical examinations as have been found practicable. In each locality mills have been selected for investigation so as to secure for that locality physical examinations of boys from mills of both old and modern construction, and of boys employed in the manufacture of all the different varieties of cotton fabrics represented in the locality, and of a sufficient number of boys of each nationality or race represented among mill employees to justify comparisons. In every mill selected for investigation every male minor employed was subjected to a physical examination.

In the actual conduct of the physical examination it was the practice to arrange beforehand with the mill management all matters relating to the number of minors subject to examination, the manner in which they should be presented for examination with the least possible interference with the mill work, and a suitable place for making the examinations. In every instance but one it was found possible to provide a room in the office building of the factory for the examination, and in this one instance rooms in a private house adjacent to the factory were secured. Not only has no objection on the part of a mill management been encountered to having such rather elaborate examinations conducted on their premises, but when the purposes of the examinations have been understood the work of the examiners has invariably been facilitated in every possible way by every one in authority in the mills.

In conducting the examinations the examination blank hereto attached was carefully followed, and all apparatus necessary for the purposes indicated therein was, before beginning actual work, brought to the room selected and installed with view to such convenience of operation as conditions permitted. In some instances, through the courtesy of the new management, the examinations were supplemented by further investigations of certain cases at local hospitals.

In connection with the form of the examination blank above referred to, it is to be noted that there appears on the examination form a considerable number of abnormalities which are assumed to be present if not crossed out during the course of the examination. This scheme was adopted to assure the direction of the attention of the examiners to possible defects which otherwise might be overlooked. The boys were invariably stripped to the waist. Owing to the temperature of the mills, the only other garment usually worn was a thin pair of overalls, and even though this garment was seldom entirely removed, it may be said the physical examinations were usually as complete and satisfactory as though every boy had been actually stripped. Most of the boys were either barefooted or wore "sneakers" or slippers which could readily be kicked off.

In further effort to secure information regarding the possible effects of the occupations on boys employed in the cotton mills, these physical examinations have been supplemented by a study of the records of the hospitals in Lowell, Lawrence and Fall River relative to the causes of admission of cotton mill operatives, whether as dispensary or hospital patients. Although such hospital records suggested several directions in which study might be directed in an investigation of the effects of mill work upon female operatives, so far as males are concerned the information secured from this source seemed to be almost entirely of negative value.

In considering the tabulation, appearing in another part of this report, of the diseases and defects disclosed by the physical examinations of the boys, it is to be remembered that this investigation was made in the year 1915 in the State of Massachusetts, a State which has been a pioneer in matters of industrial legislation. Among the provisions of Massachusetts laws which have a direct bearing on the employment of minors, and which the results of these physical examinations indicate are being enforced even more effectively than is generally supposed, the following may be cited: —

No child under fourteen years of age is permitted to be employed in any capacity in an industry like a cotton factory. No person under eighteen can be employed in a cotton factory without an employment certificate issued by the local school authorities, certifying that the person has complied with certain educational requirements carefully prescribed by law, and if the person be under sixteen years of age he must have in addition a certificate from a physician authorized by the school authorities, declaring the minor to have been physically examined and found physically fit to perform the particular kind of work specified in the certificate. A change in the character of the work calls, under the law, for a new certificate. In other words, every boy who was physically examined in this investigation, and who started to work before he was sixteen, had been examined by a physician under the direction of the local school authorities before he was allowed to go to work.

Under Massachusetts laws no minor less than sixteen years of age is permitted to work more than eight hours a day or more than forty-eight hours a week, and no boy between sixteen and eighteen years is permitted to work more than ten hours a day or fifty-four hours a week. The Massachusetts statutes also enumerate certain kinds of work in which the employment of minors is prohibited, and empower the Board of Labor and Industries to add to the number if it sees fit.

Among the list of machines which minors are forbidden to operate or assist in operating, the following may be cited as examples: circular or band saws; wood shapers; jointers or planers; picker machines used in picking wool, cotton, hair or any other material; leather burnishers; job or cylinder printing presses operated other than by foot power; stamping machines used in metal manufacture; metal or paper cutting machines; laundering machinery; practically all machinery used in shaping or handling iron plates, in work involving proximity to moving belts or gears, etc. Even between sixteen and eighteen minors are not permitted in or about blast furnaces, oiling or cleaning "hazardous" machinery in motion, at polishing or buffing, switch tending, in the manufacture of explosives, matches, alcoholic liquors, etc.

It is also to be remembered that this investigation is made in a State free from hookworm infection, at least so far as the native population is concerned; practically free from malaria, at least so far as cotton manufacturing centers are concerned, — a State with a very low typhoid fever morbidity, and where the prevention of tuberculosis and protection of public health generally has been given unusual attention. Furthermore, in all the localities covered by this investigation there are well-equipped hospitals, and an effort is made, at least, to comply with the State law requiring a medical supervision of school children.

## Description of the Manufacture of Cotton Fabrics.

As shown by Table No. 2, the boys examined were found engaged in the performance of a variety of tasks in the mills, each kind of work being designated by a technical term well understood in the textile industry. The general character of the labor involved in each instance will appear from a brief description of the manufacture of cotton fabrics.

The bales of cotton are opened up in what is ordinarily referred to as the "opening room," which may or may not be entirely shut off from the "picking room," where the cotton undergoes the first stage of its preparation for the manufacture of cloth. As the bales arrive at the mill with all the dirt that has been accumulated on their journey since leaving the cotton gin, their opening is attended with the production of more or less dust, even when "breaking" machines are equipped for removal of dust. No minors were found engaged in this work. After the bales are opened the cotton is deposited in bins in the picking room. Usually this transfer of cotton to the bins is now accomplished in Massachusetts mills by blowing it through large pipes, the blowing at the same time tending to loosen up the cotton and overcome the effects of the compression of the cotton in the bale.

The object of the process to which the cotton is subjected in the "picking room" is further to break up compressed bunches of cotton and remove all dirt, seed husks, moats, fibers or snarls, leaving nothing but workable cotton at the end. This is accomplished entirely by automatic machinery. The cotton is fed from the bins into hoppers, whence it passes through a succession of revolving rollers and cylinders which have the effect of repeatedly picking the cotton apart, pressing it and sifting it. The amount of dust evolved in the picking process depends upon the kind of picking machinery in use.

From the picker the cotton automatically goes through the "carding" process, in which it is compressed into a flat, mat-like affair, or "lap," and passed under revolving toothed cylinders, the effect being to reduce the cotton to a homogeneous consistency and to cause the fibers to assume a parallel direction. At the end of the carding process the compressed cotton mat or "lap" is split up into thick ribbons or "slivers" which are automatically coiled into portable receptacles provided for the purpose.

In the mills manufacturing coarser fabrics these "slivers" as they come from the carding machines may be directly subjected to the twisting preliminary to the spinning process. Where the finer goods are manufactured the cotton must first be "combed."

The object of combing is to remove from the cotton the short fibers. In this process the "slivers" are fed into machines which again press them together in the shape of a fleece or "lap," — but a much narrower "lap" than in the carding process, — and after combing out the short fibers with revolving toothed cylinders the machines again split the cotton up into "slivers" and coil them into portable receptacles as before. Absorbent cotton is the rejection of combing machines. Whether subjected to "combing" or not, the "slivers," which thus far are held together merely by the result of the compression to which the cotton has been subjected by revolving rollers, are combined ("drawn") and twisted to some extent to give them sufficient tensile strength to stand actual spinning. At the end of this intermediate process the "slivers" or "roves," as they are now commonly referred to, come out wound on bobbins.

The transfer of the full bobbins from the "jacks," as the last machines in this intermediate process are called, to the spindles on the spinning machines is done by hand. The full bobbins are taken off the jacks, put into basket hampers on casters, which are pushed along by a man or boy as he loads the hamper, and thence along the rows of spindles on the spinning machines as he removes empty bobbins from these spindles and replaces them with the full ones from the hamper.

By the spinning process the "roves" as they come from the "jacks" are converted into "yarns," so called. In the spinning process the "roves" are combined, stretched and twisted, the amount of building up, the rapidity of twisting and the degree of tension being varied in order to assure the strength, size and consistency of yarns or threads desired for the particular kind of fabric to be manufactured. The character of the yarn is also varied according to whether it is to form the "warp," or longitudinal threads of the cloth, or the "weft" or "filler," or cross threads of the cloth.

There are two general types of spinning machines in common use known, respectively, as "mules," and "ring spinners," or "frames," as they may be referred to, and each type may vary somewhat with different manufactures of textile machinery. The essential difference between the two types of machines is, however, that the "mule" alternately twists a few feet of the "yarn" and then winds the twisted section on a bobbin, while in the "frame" machine the twisting and winding proceed simultaneously. In the "mule" the portion of the machine carrying the bobbin spindles for the twisted yarn travels across the floor for a few feet on a track to and from the stationary part of the machine, while in the "frame" all parts of the machine are stationary. Whichever type of spinning machine may be used, when once the "roves" are arranged to give a "yarn" of a desired strength, size and consistency, the spinning is supposed to proceed automatically. The mill operative known as a spinner is to-day supposed merely to see that the machine is working properly and to join again the ends of yarns which may break in the spinning process. The operative who keeps a "mule" supplied with full bobbins of "roves" in the manner already described is known as a "back boy."

The removal from the spinning machines of the full bobbins of twisted "yarn" is likewise made by hand. The operatives who replace these full bobbins with empty ones, rolling the hampers along the rows of spindles, throwing in the full bobbins and taking out empty ones to replace them, are known as "doffers."

After the cotton has been put through the spinning process the "yarns" designed to form the "warp," or longitudinal threads of the cloth, receive special treatment in what may be termed the spooling, warping and slashing department. The "warp yarns" are first wound from the bobbins, as they come from the spinning machines, onto "spools" large enough to take the contents of several bobbins. As the end of the yarn on one bobbin is reached the operator of the machine ties to it the yarn from another bobbin, so that the spool holds a continuous yarn. This tying is now usually done by an automatic tying device held in the operator's hand. From the spool the yarn is wound on a "warper," which puts all the yarns that are going to form the warp of a piece of cloth on a "section beam." This "beam" is a large, heavy reel somewhat longer than the width of the cloth to be manufactured. In order to give the warp yarns the firmness and smoothness necessary for weaving they are treated to what is known as "size" or "sizing." To do this the yarns are unwound from one beam and wound onto another, and in the meantime pass through a "slasher" containing a hot solution of starch and other ingredients. Where colored fabrics are woven, or where colored figures are woven into the fabric, the yarns are in a somewhat similar manner passed through dye solutions, although yarns may be dyed in "hanks" and "weft yarns" perhaps on the bobbins.

In the case of prints the colored figures are printed into the cloth by passing it under printing rollers after it has been woven and bleached.

When the warp has been "sized" and wound on the "beam" the end of each individual "yarn" must be threaded through a corresponding pendant loop or eye in an arrangement called a "harness," which holds the warp in place in the loom. This tedious work of threading the "warp yarns" through the loops in the "harness" is now usually accomplished by machines invented for the purpose. Such machines at present, however, are not likely to give perfect results, so that their work must be carefully inspected and probably a greater or less number of yarns threaded through their loops by hand. Those boys in Table No. 2, stated to be employed at "drawing in," were engaged in or assisting this work. The two boys designated in Table No. 2 as "beam changers" were employed in shifting the "warp beams" about the "slasher," or wheeling them to and from the weaving rooms.

The warp as thus prepared is fed through the looms from the "warp beams." The "weft" or "filler" is fed from bobbins, and just as the yarn comes from the spinning machines, except when it may have been afterwards dyed. The looms, like all other machines in a cotton mill, are intended to work automatically, — to accomplish by themselves a definite purpose. The weaver, like every other operative in a mill, merely sees that the loom is supplied with material for its work and is working properly, and remedies occasional defects of its operation. There is no opportunity for a cotton mill operative to increase output by speeding up a machine. He can increase his output only by increasing the number of machines he can attend to and produce work of an acceptable quality. While all looms are intended to be automatic, the term "automatic loom" is applied to a newer type of loom lessening the need of attention from a weaver. It is equipped, among other things, with an electrical device which causes the loom to stop automatically if a warp thread breaks, and a "magazine" which feeds bobbins of "weft yarn" automatically to the loom, obviating the necessity of replacing empty weft yarn bobbins singly by hand. It is the function of the "battery boy" referred to in Table No. 2, to keep these magazines supplied with bobbins of "weft yarn." Among the mills investigated was one where hosiery was manufactured. In this the preparation of the cotton was essentially the same as has been described, but the yarns are built up to be bulkier, and knitting machines replace looms.

One absolute essential to the manufacture of cotton fabrics is a certain degree of relative humidity in the atmosphere. Moisture is necessary to give the cotton fibers the requisite degree of pliability and cohesion, but above all, atmospheric moisture is necessary to maintain good electrical conductivity in the air and prevent the accumulation of static electricity in the cotton as it is being worked. Cotton charged with electricity is unworkable, and without the proper amount of humidity static electricity quickly manifests itself in the cotton, particularly when it is being unwound and wound on rapidly revolving spindles in the "yarn" making processes. For this reason, localities having, normally, considerable atmospheric humidity are even to-day preferred for the manufacture of cotton goods, but everywhere in this country, at least, moisture must at times be supplied artificially to the air in cotton mills.

The old way was to admit steam into the room from jets from steam pipes. While this old process was used in parts, at least, of many if not most Massachusetts mills visited, the so-called humidifiers, of which there are several types, are in common use, and are supplanting the old steam jet system. In principle the humidifier is an apparatus attached to the ceiling of a room, and from which water in the form of a fine spray is blown out by compressed air. Humidifiers are generally designed to work automatically, starting the spray when the relative humidity falls below a certain percentage, and stopping when the humidity of the air is raised sufficiently. They are preferable to the steam jets because they insure a more constant supply of moisture and better distribution. In one mill building of modern construction included in the investigation the entire air supply of the building was washed, heated and moistened to the requisite degree, and delivered by blowers to the various rooms. This matter of temperature and humidity of the mills is further considered in another part of the report.

TABLE No. 1. — *Departments of the Mills in which Male Minors were found employed, and the Number employed in Each.*

| DEPARTMENT. | Number of Male Minors employed. |
|---|---|
| Spinning (ring), | 259 |
| Weaving, | 167 |
| Spinning (mule), | 125 |
| Carding, | 27 |
| Cloth (inspection, baling and shipping of cloth), | 22 |
| Twisting (spinning department), | 12 |
| Knitting (hosiery mill), | 12 |
| Drawing-in (helping girls to attach warps to harnesses — spooling, warping and slashing departments). | 9 |
| Napping (special process for putting soft finish on certain fabrics), | 5 |
| Slashing (giving sizing to warp — spooling, warping and slashing departments), | 4 |
| Winding (spooling, warping and slashing departments), | 4 |
| Combing (carding department), | 4 |
| Spool (spooling, warping and slashing departments), | 3 |
| Hose finish (hosiery mill), | 3 |
| Box (cloth room), | 3 |
| Button (hosiery mill), | 2 |
| Harness (spooling, warping and slashing departments), | 2 |
| Machine (machine shop), | 2 |
| Electrical, | 2 |
| Picking, | 1 |
| Dyehouse, | 1 |
| Yard, | 1 |
| Rolling (cloth department), | 1 |
| Press (cloth department), | 1 |
| Carpenter, | 1 |
| Cuff (hosiery mill), | 1 |
| Blanket (storeroom), | 1 |
| Office, | 1 |
| Marking (cloth room), | 1 |
| Designing, | 1 |
| Tin shop, | 1 |
| Totals, | 679 |

## TABLE NO. 2. — *Special Work and Ages.*

[The occupations stated in this table are those in which the boys were actually found at work at the time of their examinations.]

| SPECIAL WORK. | 14 to 15 Years. | 15 to 16 Years. | 16 to 17 Years. | 17 to 18 Years. | Totals. |
|---|---|---|---|---|---|
| Sweeper, | 42 | 59 | 39 | 14 | 154 |
| Back boy, | 25 | 28 | 34 | 18 | 105 |
| Weaver, | 12 | 18 | 34 | 36 | 100 |
| Doffer, | 1 | 2 | 32 | 45 | 80 |
| Helper, | 2 | 3 | 12 | 20 | 37 |
| Cleaner, | 2 | 10 | 7 | 5 | 24 |
| Drop wire boy, | 6 | 6 | 6 | 5 | 23 |
| Spinner, | 1 | 8 | 9 | 4 | 22 |
| Battery boy, | 3 | 4 | 6 | 3 | 16 |
| Spare hand, | 1 | 2 | 6 | 7 | 16 |
| Bobbin boy, | - | 2 | 5 | 3 | 10 |
| Tuber, | 5 | 2 | 1 | - | 8 |
| Oiler, | - | - | 3 | 4 | 7 |
| Folder, | - | - | 2 | 3 | 5 |
| Clerk, | - | - | 2 | 3 | 5 |
| Yarn boy, | - | - | 3 | 2 | 5 |
| Stenciller, | 1 | - | 2 | 1 | 4 |
| Winder, | - | - | 1 | 3 | 4 |
| Twister, | - | - | 2 | 2 | 4 |
| Roving boy, | - | - | 2 | 1 | 3 |
| Belt boy, | - | - | 2 | 1 | 3 |
| Picker, | 1 | - | 1 | 1 | 3 |
| Weigher, | - | 1 | 2 | - | 3 |
| Cutter, | - | - | 1 | 2 | 3 |
| Stitcher, | 1 | - | 2 | - | 3 |
| Eyelet machine, | - | - | 2 | - | 2 |
| Box boy, | 1 | - | 1 | - | 2 |
| Tool boy, | 1 | 1 | - | - | 2 |
| Packer, | - | 1 | - | 1 | 2 |
| Beam changer, | - | - | - | 2 | 2 |
| Carpenter, | - | - | - | 2 | 2 |
| Chain pegger, | 1 | - | 1 | - | 2 |
| Comber, | - | - | 1 | 1 | 2 |
| Sewing machine, | 1 | - | - | - | 1 |
| Machinist, | - | - | - | 1 | 1 |

TABLE NO. 2. — *Special Work and Ages* — Concluded.

| SPECIAL WORK. | 14 to 15 Years. | 15 to 16 Years. | 16 to 17 Years. | 17 to 18 Years. | Totals. |
|---|---|---|---|---|---|
| Cloth booker, | - | - | 1 | - | 1 |
| Cloth inspector, | - | - | - | 1 | 1 |
| Steam tender, | - | - | - | 1 | 1 |
| Presser, | - | - | 1 | - | 1 |
| Drawing-in boy, | - | - | - | 1 | 1 |
| Size maker, | - | - | - | 1 | 1 |
| Harness cleaner, | - | - | 1 | - | 1 |
| Peg boy, | - | - | 1 | - | 1 |
| Planer, | - | - | 1 | - | 1 |
| Solderer, | - | - | - | 1 | 1 |
| Carder, | - | - | 1 | - | 1 |
| Grinder, | - | - | - | 1 | 1 |
| Sleeve boy, | - | - | - | 1 | 1 |
| Cuff boy, | - | - | - | 1 | 1 |
| Totals, | 107 | 147 | 227 | 198 | 679 |

## DEFINITIONS.

*Sweeper.* — Term applied to boys in spinning rooms who keep floor clean with brooms or mechanical sweepers.

*Back Boy.* — Shifts roving bobbins on mules, *i.e.*, keeps the types of spinning machines known as a "mule" supplied with full bobbins of the cotton which has been prepared for the spinning process, and removes empty bobbins.

*Doffer.* — Removes filled bobbins from either "mules" or other type of spinning machine known as "frames," and puts in place of the filled bobbin an empty one to receive the product of the machine.

*Helper.* — Usually applied to a boy who helps a mule spinner look after broken yarn.

*Cleaner.* — So far as above list is concerned the cleaners were employed in keeping the spinning frames from becoming clogged with lint or grease. A few, however, in the same way keep looms clean.

*Drop Wire Boy.* — A term applied to a boy who hangs a small piece of metal ("drop wire") over each warp yarn in a certain type of loom so designed that when a warp breaks the "drop wire" drops and makes an electrical connection which stops the loom.

*Spinner.* — Runs spinning machines, either mule or frame.

*Battery Boy.* — Keeps the "magazine" on an automatic loom supplied with full bobbins.

*Bobbin Boy.* — A boy in either the spinning or weaving room who picks up empty bobbins and returns them to their proper places.

*Tuber.* — Boy who follows a doffer and slips over the steel spindles little paper cylinders or tubes to prevent bobbins from slipping on the steel spindles, and to facilitate removal of bobbins.

*Spare Hand.* — A helper anywhere or one who "fills in" in the absence of a regular operative.

*Folder.* — Folds cloth when necessary in cloth room.

*Yarn Boy.* — Helps in arranging bobbins of warping yarn to be spooled preparatory to winding on the warping beam for sizing, sizing being the application of the starch mixture to the warp yarns in a "slasher."

*Winder, Twister.* — Both attend to bobbins in spooling department.

*Roving Boy.* — Boy in the carding or mule-spinning room who handles the roving, that is, the coarsely twisted cotton being prepared for the spinning stage.

*Belt Boy.* — Boy so designated helps in repairing leather machinery belts.

*Picker.* — Virtually means any one who works in the picking room.

*Cutter, Stitcher.* — Assist in the preparation of cloth for the printing in mills where prints or calico are manufactured.

*Box Boy, Packer.* — Assist in preparing cloth for shipment in cloth room.

*Beam Changer.* — Handles or assists in handling the heavy reels or "warp beams" on which the warp yarns are wound for the sizing process, and also from which the warp yarns are again unwound to feed the looms. While the beams are rather heavy affairs, the need of physical stength in handling them is lessened by mechanical appliances provided for this purpose. Two husky seventeen-year-old boys were found employed as beam changers.

*Chain Pegger.* — In connection with the mechanism of a loom designed to weave fancy cloth there is a flattened chain-like affair bored on one side with holes for small iron pins or "pegs." The location of the pins determines the form of the pattern in the cloth as it is being woven. The chain pegger puts the iron pins or pegs in the holes in the chains as indicated, preparatory to starting to weave cloth of a certain pattern, or removes the pegs after the cloth has been woven.

*Comber.* — Attends to combing machines in the carding department.

*Cloth Booker.* — A cloth-room clerk.

*Presser.* — Attends to a machine in the napping room, where the surface of the cloth is scratched up to give it an appearance like canton flannel.

*Drawing-in Boy.* — Assists girl in attaching warp yarn to harnesses, a harness being the device for holding the warp yarns in a loom.

*Size Maker.* — Mixes the starch and other ingredients for the sizing solution.

*Harness Cleaner.* — Cleans and repairs the loom harnesses after use.

*Peg Boy.* — Same as "chain pegger."

*Planer.* — The boy so designated in Table No. 2 apparently ran a planing machine in the department where the packing boxes were made.

*Carder, Grinder.* — Operatives in the carding room.

*Sleeve Boy, Cuff Boy.* — Attend to machines in hosiery mills.

As may be inferred from the above description of the wide variety of duties at which these boys were found employed, investigation showed that practically all were engaged in work that required very little actual physical exertion at any time. The most notable exception to this statement was the employment of two strong seventeen-year-old boys as "beam changers," but even in this instance the amount of actual muscular exertion called for at any time was not likely to be as great as if the same boys had been employed on a grocery delivery wagon. It is of course true that even the lightest work if sustained for a considerable period may prove decidedly exhausting, particularly if monotonous or involving nervous tension or eye strain. It is conceivable that at times the powers of endurance of some of the boys examined may have been taxed by some work that they have had to do. Even in "doffing," which ordinarily could not be considered hard work for a normal fourteen-year-old boy, the employment of older boys or men is found desirable when large yarns for certain heavy fabrics make the bobbins heavy and clumsy. It is entirely possible, also, that in some mills boys may be employed at work in which none were found engaged in the mills investigated; nevertheless, what impresses one who watches mill boys at their work is the intermittent character of their duties. An effort to estimate the spare time of the boys examined indicated that ordinarily the duties of sweepers, back boys, doffers and cleaners — duties which most of the boys under sixteen years of age are found performing — involve a total of about five hours of actual labor out of the eight they are permitted by law to work. As an illustration of the intermittent character of the boys' work, for their physical examinations the boys were brought from the various mill buildings and departments to the office building. While the examinations were in progress there were usually six boys in the examination room at the same time, sometimes less, but frequently more. It was understood that the overseer of this department should send boys for their physical examination as the work of his department permitted, and on completion of examinations at each mill pains were taken to learn what inconvenience to the work the examinations had involved. While it was evident more or less disturbance to the work must have occurred, it was never necessary, so far as could be learned, actually to stop a single machine by reason of the absence of the boys for their physical examinations. Their duties could always be attended to temporarily by those remaining.

When this intermittent character of the work, as well as the varied bodily movements involved in the performance of the duties of most of the boys, is considered, there remain only a few scattering jobs, like "drawing-up," "eyelet machine," etc., tending toward the maintenance of a posture which might have an unfavorable effect upon a boy's physical development. There was, however, a noticeable tendency for the taller boys to be stooped, while the shorter ones were usually straight and well set up. In mills, as outside, everything is arranged with reference to the convenience of those of average height. None of the boys was found engaged in work or working under conditions involving use of the eyes that could be regarded as harmful to persons of normal eyesight. The hazard to boys with defective vision is considered in another part of this report.

The work at which most of the boys are employed in a cotton factory is monotonous, inasmuch as it does not necessarily involve more than a repetition of the same manual acts; but unlike the tasks of a bookkeeper, an elevator operator or the ordinary operator of some special machine in the average modern manufacturing establishment, a cotton mill operative has an opportunity, if he has the mentality to grasp it, to study the mechanism of most ingenious machinery, and to see the part his own tasks play in the whole highly technical and most interesting process of manufacturing cotton fabrics. Superintendents and overseers are made from boys who possess such mentality.

The work at which boys are employed would appear to involve but a slight hazard in the way of industrial accidents. The acute injuries revealed by the physical examinations consisted entirely of a few trivial cuts or scratches, and out of the 679 boys not more than 2 showed permanent results of injuries possibly received in the cotton industry. One of these two is a boy who had lost a portion of two fingers and suffered from a slight disability of the hand from getting the hand caught in gears. In this instance, through an oversight, however, the record fails to show if the accident occurred in the mill or in some other previous employment.

## Chemical Poisoning.

Dangers of chemical poisoning can apparently be excluded so far as any work is concerned in which male minors were found employed in the course of this investigation, and, except in a few possible instances, in work at which male minors are likely to be found employed in the cotton industry. The fact, however, is not ignored that there are certain processes incident to the manufacture of cotton fabrics which do involve possible hazards of chemical poisoning in connection with which minors may be found employed. In connection with the dyeing processes it would appear that there is likely to be exposure to any poisonous effects which the chemicals used may possess. This seems to be especially true of the method of dyeing "in the hank." A wide variety of aniline dyes is used in the cotton mills, and the dyeing preparations are so complicated chemically and so subject to experimentation that it would seem that any known chemical which would not destroy cotton fiber might possibly be found some time in a dyeing solution. The possible hazards of this phase of the industry, however, received little attention in this particular investigation, as but one boy was found employed in connection with dyeing processes, and he certainly showed no indications of poisoning or other unfavorable effect of his work.

There may also be some possible dangers of chemical poisoning in connection with several processes made use of in the manufacture of "prints," including the bleaching of cloth; but as no minors were found employed in these processes their possible hazards are not considered in this report.

There was one process involving the use of chemicals with which a few boys were more or less directly connected, and this was "slashing" or the application of "sizing." "Sizing" or thickening is necessary for all single-twist warp yarns. The primary object of sizing is to increase the strength and smoothness of the thread so that it will be able to stand the strain and friction of the weaving process. The effect of sizing upon the weight, bulk, appearance and durability of the cloth also has to be considered. To stick down loose cotton fibers so as to strengthen the yarn, and to hold in the yarn other ingredients of the sizing, flour or starches of some sort are used. These may include both dextrine and gums. To render the yarn pliable and smooth, tallow, grease, oils, wax, glycerine and soap are practically the only substances used. For giving mere weight to the yarns china clay, French chalk and barytes may be put in the sizing. As deliquescents to enable the cotton to retain moisture, magnesium chloride, generally referred to as "Anit," is commonly used, although calcium chloride, glycerine or common salt may be employed for this purpose. As an antiseptic to prevent mildew or other bacterial growths which may change the color or affect the durability of the cloth, zinc chloride is practically the only substance ever used. In addition to the above, Epsom salts or Glaubers salts may be used for weighting bleached or colored cloth.

From the above it therefore appears that sizing is not likely to contain any chemicals the handling or mixing of which would be expected to offer any health hazards.

In the examination of every boy, however, possible indications of chemical poisoning were kept always in mind. As appears from the examination blank, a "lead line" on the gums was looked for as a routine procedure. In each instance finger nails were carefully inspected for signs of erosion or staining. Hands, arms and the skin generally were examined with reference to dermatitis or other abnormal condition. A single case of a slight dermatitis of the hands and forearms was found, evidently due to the character of the soap used in washing a tender skin. As appears from the tabulation of defects acne was not uncommon, and a few boils were found; but in no instance was there reason to suspect chemical poisoning as a cause. Nor was there found in any other instance indications to give rise to suspicions of chemical poisoning from any source.

So far, therefore, as physical effects of cotton factory work in the State of Massachusetts on male minor employees are concerned, the hazards of the industry practically boil down to the possible effects on the minors of the atmospheric conditions of the mills, not merely on the healthy and vigorous, but on those who may be in some way or other abnormal.

Then, too, one cannot conduct an investigation of this character without thinking of what might be termed the possible "moral hazards" of cotton factory employment. The boys found performing the ordinary duties of mill boys varied as much in mental capacity and motives for entering this employment as they did in physique. In the mills examined during the summer there were found school boys who had taken this means of earning money for themselves for a portion of their summer vacations. On others, fatherless families were depending for support. Some were working to support a father who had himself quit work as soon as he could put enough children at work in the mill to enable him to live without working himself. Many had been taken out of school as soon as the law would allow and made to go to work by parents, themselves mill operatives, who regard children as assets to add to the family income. One instance accidentally came to attention in which a mill was paying to one family of operatives $40 a week, and further inquiry showed that such instances were not unusual. Among the boys could be picked out the type on which the future of the textile industry of the State must depend if it is to survive. With them were boys in whom an education which ended in the lowest grades of the public school represented the limit of their mental capacity, the frankly feeble-minded, the vicious and depraved, even those with actual criminal records.

The cotton factory does not appeal to the average boy in spite of the fact that the industry offers great remunerative possibilities to a boy of some brains and ambition. Whatever may be the reason which brought the boy to work in the mill he will usually be found talking of doing something else, of learning a machinist's or plumber's trade, or "joining the navy." This attitude is favored by the fact that cotton factory work is largely a woman's work, and if a boy has not the capacity to rise above the position of a mere operative he is likely later to find himself at a disadvantage in competion with women. Then, too, in a cotton manufacturing center the mill always has something in the way of employment any one can undertake, — the physically weak, the shiftless, the improvident, and those who for one reason or another have failed to succeed in other occupations. The extent to which employment in this industry is a temporary occupation for boys under eighteen is well illustrated by the fact that whereas out of the 679 boys examined 425 were over sixteen and 198 over seventeen years of age, yet only 203 had a total of two years' employment in cotton mills to their credit, and but 78 a total of three years. Of the 679 boys the total mill employment of 220 was less than six months. It is also to be noted that the mill employment with which the boys are credited was in many instances not continuous but interrupted by employment at other occupations.

### Race or Nationality.

A majority of the male minors examined were either born in this country or came here very early in life. In the following table, No. 3, they are classified according to the racial extraction or nationality of their parents.

Table No. 3. — *Nationality or Racial Extraction.*

| | 14 Years Old. | 15 Years Old. | 16 Years Old. | 17 Years Old. | Totals. |
|---|---|---|---|---|---|
| French Canadian, | 47 | 58 | 103 | 83 | 291 |
| Portuguese, | 11 | 11 | 37 | 33 | 92 |
| English, | 18 | 35 | 21 | 22 | 96 |
| Irish, | 17 | 14 | 28 | 28 | 87 |
| Greek, | – | – | 3 | 7 | 10 |
| Italian, | 2 | 2 | 2 | 2 | 8 |
| Polish, | 9 | 16 | 20 | 8 | 53 |
| American, | – | 4 | 4 | 9 | 17 |
| Miscellaneous, | 3 | 7 | 9 | 6 | 25 |
| Totals, | 107 | 147 | 227 | 198 | 679 |

### Physical Development and Strength.

The following tables, Nos. 4, 5, 6 and 7, show the average weight, physical proportions and grip strength, according to their ages, of the male minors examined in the cotton factories. The classification as to racial or national extraction appearing in the tables is based on the race or nationality of the parents. The strength of grip test shown in kilograms was as registered by a Collin's dynamometer. The height measurements are without shoes. The boys were not weighed stripped, but they were often clad only in overalls and undershirt, and it is believed that 4 pounds would be a very liberal estimate of the average weight of clothes worn at the time the weight was taken.

### TABLE No. 4. — *Age from Fourteen to Fifteen Years.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | Average Height in Inches. | Maximum Height. | Minimum Height. | Average Weight in Pounds. | Maximum Weight. | Minimum Weight. | AVERAGE CHEST MEASURE. | | Maximum Chest Measure, Inflated. | Minimum Chest Measure, Inflated. | AVERAGE STRENGTH OF GRIP IN KILOGRAMS. | | MAXIMUM STRENGTH OF GRIP IN KILOGRAMS. | | MINIMUM STRENGTH OF GRIP IN KILOGRAMS. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Inspiration. | Expiration. | | | Right Hand. | Left Hand. | Right Hand. | Left Hand. | Right Hand. | Left Hand. |
| French Canadian, | 47 | 59.60 | 66.75 | 53.75 | 93.80 | 137.00 | 70.00 | 29.60 | 27.17 | 34.75 | 25.50 | 23.70 | 22.60 | 45.00 | 41.00 | 15.00 | 12.00 |
| Portuguese, | 11 | 57.70 | 60.75 | 53.25 | 88.00 | 107.00 | 72.00 | 29.45 | 27.10 | 31.50 | 27.00 | 23.19 | 22.09 | 33.00 | 33.00 | 9.00 | 9.00 |
| English, | 18 | 59.33 | 69.50 | 53.25 | 93.06 | 137.50 | 60.00 | 29.33 | 27.35 | 34.25 | 24.50 | 24.55 | 24.00 | 35.00 | 33.00 | 15.00 | 13.00 |
| Irish, | 17 | 60.40 | 65.75 | 56.25 | 91.61 | 128.00 | 76.00 | 29.45 | 27.28 | 33.00 | 27.00 | 24.28 | 23.00 | 32.00 | 32.00 | 18.00 | 15.00 |
| Greek, | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Italian, | 2 | 60.25 | 62.75 | 57.75 | 96.00 | 116.00 | 76.00 | 29.80 | 28.25 | 32.00 | 27.75 | 28.00 | 28.00 | 31.00 | 32.00 | 25.00 | 24.00 |
| Polish, | 9 | 58.90 | 63.25 | 56.75 | 89.40 | 110.00 | 75.00 | 29.20 | 27.10 | 30.00 | 25.00 | 25.63 | 24.55 | 38.00 | 36.00 | 18.00 | 14.00 |
| American, | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Miscellaneous, | 3 | 62.40 | 63.25 | 61.57 | 101.00 | 116.00 | 88.00 | 30.80 | 28.20 | 32.50 | 29.25 | 26.00 | 22.67 | 33.00 | 31.00 | 20.00 | 13.00 |
| All nationalities, | 107 | 59.52 | 69.50 | 53.25 | 92.60 | 137.50 | 60.00 | 29.52 | 27.25 | 34.75 | 24.50 | 24.38 | 23.11 | 45.00 | 41.00 | 9.00 | 9.00 |

### TABLE No. 5. — *Age from Fifteen to Sixteen Years.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | Average Height in Inches. | Maximum Height. | Minimum Height. | Average Weight in Pounds. | Maximum Weight. | Minimum Weight. | AVERAGE CHEST MEASURE. |  | Maximum Chest Measure, Inflated. | Minimum Chest Measure, Inflated. | AVERAGE STRENGTH OF GRIP IN KILOGRAMS. |  | MAXIMUM STRENGTH OF GRIP IN KILOGRAMS. |  | MINIMUM STRENGTH OF GRIP IN KILOGRAMS. |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  | Inspiration. | Expiration. |  |  | Right Hand. | Left Hand. | Right Hand. | Left Hand. | Right Hand. | Left Hand. |
| French Canadian, | 58 | 61.25 | 66.75 | 56.25 | 119.50 | 162.00 | 73.00 | 30.75 | 27.00 | 37.50 | 26.25 | 27.80 | 26.80 | 42.00 | 43.00 | 15.00 | 13.00 |
| Portuguese, | 11 | 60.50 | 65.75 | 56.75 | 109.00 | 129.50 | 82.50 | 31.00 | 29.00 | 35.50 | 28.00 | 27.50 | 27.00 | 43.00 | 37.00 | 20.00 | 20.00 |
| English, | 35 | 62.60 | 68.75 | 55.75 | 108.00 | 139.00 | 80.00 | 31.25 | 28.75 | 36.50 | 27.00 | 29.00 | 28.00 | 38.00 | 41.00 | 19.00 | 19.00 |
| Irish, | 14 | 60.50 | 67.75 | 54.50 | 95.60 | 135.00 | 64.00 | 29.80 | 27.40 | 33.50 | 26.00 | 26.50 | 25.50 | 41.00 | 34.00 | 19.00 | 15.00 |
| Greek, | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Italian, | 2 | 64.25 | 68.25 | 60.25 | 117.50 | 130.00 | 105.00 | 31.80 | 29.20 | 30.00 | 28.50 | 32.50 | 32.50 | 38.00 | 34.00 | 27.00 | 31.00 |
| Polish, | 16 | 62.10 | 67.25 | 57.75 | 105.50 | 140.00 | 79.00 | 31.25 | 29.00 | 35.00 | 28.50 | 28.00 | 27.00 | 41.00 | 39.00 | 22.00 | 20.00 |
| American, | 4 | 62.80 | 68.25 | 58.75 | 129.75 | 175.00 | 85.00 | 34.50 | 32.75 | 40.00 | 29.50 | 26.25 | 25.50 | 33.00 | 32.00 | 14.00 | 12.00 |
| Miscellaneous, | 7 | 63.90 | 68.25 | 59.25 | 112.00 | 136.00 | 82.00 | 32.10 | 29.70 | 37.00 | 29.00 | 31.00 | 29.00 | 42.00 | 40.00 | 24.00 | 20.00 |
| All nationalities, | 147 | 61.75 | 68.75 | 54.50 | 112.21 | 175.00 | 64.00 | 31.03 | 27.93 | 40.00 | 26.00 | 28.14 | 27.15 | 43.00 | 43.00 | 14.00 | 13.00 |

TABLE NO. 6. — *Age from Sixteen to Seventeen Years.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | Average Height in Inches. | Maximum Height. | Minimum Height. | Average Weight in Pounds. | Maximum Weight. | Minimum Weight. | AVERAGE CHEST MEASURE. |  | Maximum Chest Measure, Inflated. | Minimum Chest Measure, Inflated. | AVERAGE STRENGTH OF GRIP IN KILOGRAMS. |  | MAXIMUM STRENGTH OF GRIP IN KILOGRAMS. |  | MINIMUM STRENGTH OF GRIP IN KILOGRAMS. |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  | Inspiration. | Expiration. |  |  | Right Hand. | Left Hand. | Right Hand. | Left Hand. | Right Hand. | Left Hand. |
| French Canadian, | 103 | 62.50 | 71.75 | 55.25 | 110.80 | 158.00 | 74.00 | 32.00 | 29.50 | 37.50 | 26.50 | 31.10 | 29.80 | 43.00 | 45.00 | 12.00 | 12.00 |
| Portuguese, | 37 | 60.93 | 66.75 | 54.75 | 105.11 | 146.00 | 75.50 | 31.22 | 28.86 | 37.00 | 27.00 | 26.35 | 25.08 | 37.00 | 36.00 | 13.00 | 13.00 |
| English, | 21 | 62.39 | 66.50 | 54.25 | 105.24 | 125.00 | 65.00 | 30.83 | 28.39 | 35.00 | 26.00 | 27.86 | 26.95 | 40.00 | 34.00 | 18.00 | 14.00 |
| Irish, | 28 | 63.24 | 70.75 | 56.00 | 111.84 | 180.00 | 73.00 | 31.75 | 29.45 | 41.50 | 27.50 | 29.40 | 24.18 | 48.00 | 48.00 | 20.00 | 15.00 |
| Greek, | 3 | 60.75 | 61.50 | 59.75 | 103.66 | 105.00 | 102.00 | 31.83 | 29.08 | 33.00 | 30.50 | 28.33 | 29.66 | 30.00 | 31.00 | 26.00 | 28.00 |
| Italian, | 2 | 58.13 | 61.00 | 55.25 | 99.00 | 106.00 | 92.00 | 32.50 | 30.05 | 33.00 | 32.00 | 27.00 | 26.50 | 31.00 | 34.00 | 23.00 | 19.00 |
| Polish, | 20 | 63.56 | 66.50 | 58.25 | 113.28 | 134.00 | 92.00 | 32.39 | 29.85 | 38.50 | 29.00 | 30.40 | 29.50 | 45.00 | 39.00 | 21.00 | 22.00 |
| American, | 4 | 61.56 | 64.75 | 55.50 | 104.50 | 125.00 | 69.00 | 31.08 | 29.00 | 34.00 | 27.25 | 28.50 | 26.50 | 36.00 | 32.00 | 14.00 | 13.00 |
| Miscellaneous, | 9 | 63.75 | 71.25 | 57.25 | 117.44 | 192.00 | 81.00 | 32.44 | 29.94 | 41.00 | 29.00 | 32.67 | 31.22 | 46.00 | 45.00 | 23.00 | 20.00 |
| All nationalities, | 227 | 62.39 | 71.75 | 54.25 | 109.66 | 192.00 | 65.00 | 31.77 | 29.33 | 41.50 | 26.00 | 29.70 | 25.68 | 48.00 | 48.00 | 12.00 | 12.00 |

TABLE NO. 7. — *Age from Seventeen to Eighteen Years.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | Average Height in Inches. | Maximum Height. | Minimum Height. | Average Weight in Pounds. | Maximum Weight. | Minimum Weight. | AVERAGE CHEST MEASURE. | | Maximum Chest Measure, Inflated. | Minimum Chest Measure, Inflated. | AVERAGE STRENGTH OF GRIP IN KILOGRAMS. | | MAXIMUM STRENGTH OF GRIP IN KILOGRAMS. | | MINIMUM STRENGTH OF GRIP IN KILOGRAMS. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Inspiration. | Expiration. | | | Right Hand. | Left Hand. | Right Hand. | Left Hand. | Right Hand. | Left Hand. |
| French Canadian, . . | 83 | 63.94 | 70.25 | 57.25 | 117.80 | 162.00 | 82.00 | 32.69 | 30.18 | 37.00 | 28.50 | 33.84 | 32.17 | 62.00 | 50.00 | 21.00 | 19.00 |
| Portuguese, . . . | 33 | 62.83 | 67.25 | 55.50 | 111.52 | 144.75 | 75.00 | 32.21 | 29.78 | 37.50 | 27.75 | 31.27 | 29.76 | 50.00 | 46.00 | 18.00 | 12.00 |
| English, . . . . | 22 | 64.85 | 69.75 | 57.50 | 119.36 | 144.00 | 95.00 | 32.80 | 30.23 | 35.00 | 28.00 | 32.45 | 31.45 | 40.00 | 40.00 | 24.00 | 24.00 |
| Irish, . . . . | 28 | 65.34 | 71.00 | 57.75 | 124.91 | 151.00 | 94.00 | 33.49 | 30.88 | 30.00 | 30.00 | 34.75 | 33.54 | 44.00 | 44.00 | 24.00 | 26.00 |
| Greek, . . . . | 7 | 62.21 | 66.75 | 56.75 | 113.71 | 130.00 | 94.00 | 32.64 | 30.57 | 35.00 | 30.00 | 28.14 | 27.85 | 38.00 | 34.00 | 20.00 | 20.00 |
| Italian, . . . . | 2 | 61.75 | 62.25 | 61.25 | 120.50 | 122.00 | 119.00 | 32.75 | 30.75 | 33.50 | 32.00 | 36.50 | 35.50 | 40.00 | 39.00 | 33.00 | 32.00 |
| Polish, . . . . | 8 | 63.72 | 67.25 | 61.00 | 116.25 | 137.00 | 100.00 | 33.12 | 30.75 | 35.50 | 29.00 | 34.50 | 32.50 | 45.00 | 43.00 | 29.00 | 24.00 |
| American, . . . | 9 | 64.83 | 67.25 | 60.75 | 121.44 | 137.00 | 106.00 | 33.09 | 30.56 | 34.75 | 31.50 | 32.22 | 31.67 | 36.00 | 35.00 | 29.00 | 29.00 |
| Miscellaneous, . . . | 6 | 66.20 | 70.25 | 61.25 | 122.75 | 137.50 | 103.00 | 32.69 | 30.00 | 35.50 | 30.50 | 32.17 | 31.50 | 36.00 | 34.00 | 28.00 | 28.00 |
| All nationalities, . | 198 | 64.07 | 71.00 | 55.50 | 118.05 | 162.00 | 75.00 | 32.77 | 30.28 | 38.00 | 27.75 | 33.01 | 31.73 | 62.00 | 50.00 | 18.00 | 12.00 |

There do not appear to be any statistical data available for the purpose of a direct comparison of the weight and physical proportions of the boys examined with those of the same ages employed in other industries in the State of Massachusetts; but the tables below, numbered 8, 9, 10 and 11, may be of interest as showing comparisons with other groups of boys for which similar average measurements are available.

On the second line of these tables are shown, through the courtesy of the Metropolitan Life Insurance Company, from data supplied by the Department of Health of New York City, the average height and weight for the ages stated of 6,232 boys, fourteen and fifteen years of age, who were examined for employment certificates in the Borough of Manhattan, between July 13, 1914, and April 13, 1915. These boys were measured with clothes and shoes on, and allowance should be made for this fact in comparison with the boys examined in the Massachusetts cotton factories. The Metropolitan Life Insurance Company estimates that an allowance of from three-quarters to 1 inch should be made for shoes, and 8 pounds for clothes in the case of boys of the ages stated. Detailed information furnished by the Metropolitan Life Insurance Company as to the races of the boys measured indicates that they come chiefly from races in which the adults are notably smaller than the adults of the nationalities represented among the Massachusetts cotton mill boys.

The third line shows the results of measurements made in 1915 by Prof. C. W. Stiles and Dr. George A. Wheeler of the United States Public Health Service on about 770 white American school boys in a southern city "situated in the sandy coastal plain." "Heights were taken in stocking feet (without shoes), and weights were taken with clothes but without coats or shoes."

The fourth line shows the result of measurements made prior to 1887, by Prof. Dudley A. Sargent of Harvard University, of students in American preparatory schools and colleges. In connection with these figures it is to be borne in mind that the boys measured must have been largely children whose parents were of the well-to-do American professional and business classes, in which the male adults will probably average as large as any class of men in the world. It is understood that these measurements were made without shoes and stripped.

The figures on the fifth line are taken from Robert's "Anthropometry," and show the results of measurements of English boys of the English artisan class made prior to 1890. These heights are without shoes and weights without clothes.

The sixth line shows the classical figures of Bowditch, based upon measurements made some thirty years ago of over 10,000 Boston school children of the wage-earning or laboring class. At the same time Dr. Bowditch compiled separately similar figures for what he calls children of the nonlaboring class. These figures are about an inch more for height and about 3 pounds more for weight than the figures appearing in the table below.

On the seventh line of the last table are shown the minimum requirements with respect to height and weight for enlistment as apprentice seamen in the United States navy, seventeen years being the minimum age at which boys may enlist.

TABLE NO. 8. — *Comparative Physical Measurements, Age from Fourteen to Fifteen Years.*

| | Number examined. | Average Height. | Maximum Height. | Minimum Height. | Average Weight. | Maximum Weight. | Minimum Weight. | INFLATED CHEST. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Average. | Maximum. | Minimum. |
| Massachusetts cotton mill boys, | 107 | 59.52 | 69.50 | 53.25 | 92.60 | 137.50 | 60.00 | 29.52 | 34.75 | 24.50 |
| Applicants for employment certificates, New York City, | 3,405 | 61.60 | - | - | 103.69 | - | - | - | - | - |
| C. W. Stiles, southern school children, | 50 | 59.81 | 67.50 | 53.25 | 93.54 | 154.00 | 67.50 | - | - | - |
| Dr. D. A. Sargent's measurements of students, | - | 61.90 | 68.40 | 56.50 | 99.00 | 141.10 | 68.00 | 31.50 | 36.20 | 28.30 |
| Robert's English school boys, | - | 58.55 | - | - | 79.57 | - | - | - | - | - |
| Bowditch's tables, | 582 | 59.31 | - | - | 93.67 | - | - | - | - | - |

TABLE NO. 9. — *Comparative Physical Measurements, Age from Fifteen to Sixteen Years.*

| | Number examined. | Average Height. | Maximum Height. | Minimum Height. | Average Weight. | Maximum Weight. | Minimum Weight. | INFLATED CHEST. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Average. | Maximum. | Minimum. |
| Massachusetts cotton mill boys, | 147 | 61.75 | 68.75 | 54.50 | 112.21 | 175.00 | 64.00 | 31.03 | 40.00 | 26.00 |
| Applicants for employment certificates, New York City, | 2,827 | 62.80 | - | - | 107.10 | - | - | - | - | - |
| C. W. Stiles, southern school children, | 55 | 62.23 | 70.25 | 54.00 | 109.06 | 166.75 | 78.50 | 33.60 | 37.60 | 29.60 |
| Dr. D. A. Sargent's measurements of students, | - | 64.60 | 70.40 | 57.00 | 112.00 | 154.30 | 79.40 | - | - | - |
| Robert's English school boys, | - | 60.77 | - | - | 91.43 | - | - | - | - | - |
| Bowditch's tables, | 365 | 61.90 | - | - | 104.83 | - | - | - | - | - |

### TABLE NO. 10. — *Comparative Physical Measurements, Age from Sixteen to Seventeen Years.*

| | Number examined. | Average Height. | Maximum Height. | Minimum Height. | Average Weight. | Maximum Weight. | Minimum Weight. | INFLATED CHEST. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Average. | Maximum. | Minimum. |
| Massachusetts cotton mill boys, | 227 | 62.39 | 71.57 | 54.25 | 109.66 | 192.00 | 65.00 | 31.77 | 41.50 | 26.00 |
| C. W. Stiles, measurements of southern school children, | 36 | 64.48 | 69.50 | 57.00 | 109.25 | 142.75 | 77.50 | - | - | - |
| Dr. D. A. Sargent's measurements of students, | - | 67.50 | 71.20 | 63.30 | 132.00 | 152.10 | 108.50 | 35.20 | 37.90 | 31.20 |
| Robert's measurements of English school boys, | - | 63.42 | - | - | 107.86 | - | - | - | - | - |
| Bowditch's tables, | 162 | 64.65 | - | - | 119.03 | - | - | - | - | - |

### TABLE NO. 11. — *Comparative Physical Measurements, Age from Seventeen to Eighteen Years.*

| | Number examined. | Average Height. | Maximum Height. | Minimum Height. | Average Weight. | Maximum Weight. | Minimum Weight. | INFLATED CHEST. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Average. | Maximum. | Minimum. |
| Massachusetts cotton mill boys, | 198 | 64.07 | 71.00 | 55.50 | 118.05 | 162.00 | 75.00 | 32.77 | 38.00 | 27.75 |
| C. W. Stiles, measurements of southern school children, | 17 | 66.44 | 70.00 | 62.75 | 126.51 | 166.00 | 92.50 | - | - | - |
| Dr. D. A. Sargent's measurements of students, | - | 67.60 | 71.40 | 64.20 | 133.50 | 154.30 | 110.00 | 35.40 | 38.90 | 32.30 |
| Robert's measurements of English school boys, | - | 64.95 | - | - | 118.00 | - | - | - | - | - |
| Bowditch's tables, | 77 | 65.75 | - | - | 125.28 | - | - | - | - | - |
| Minimum requirements for enlistment in United States navy. | - | - | - | 62.00 | - | - | 110.00 | - | - | - |

The examiners believe that some of the boys examined in the Massachusetts mills were not as old as the ages with which they succeeded in getting themselves credited. They believe that there was evidence of successful evasions of the law to enable the boys to go to work before fourteen years of age, and also to work "full time" before reaching sixteen. But it is not believed that such evasions of the law were sufficiently numerous to affect materially the averages shown in the tables.

While caution is necessary in drawing deductions from measurements of no greater numbers of individuals than were included in this investigation, these tables appear to confirm conclusions reached in other ways in this investigation. In comparison with the measurements of other investigators of other classes of boys, the average of the fourteen-year-old Massachusetts cotton mill boy, with respect to height and weight, appears to be decidedly low. Even making allowance for shoes and clothes, the cotton mill boys of this age do not show up favorably in comparison with the fourteen-year-old New York City applicants for working certificates, in spite of the fact that other data furnished with respect to the New York boys showed that they were chiefly recruited from races much smaller than those to which the Massachusetts boys belonged. The recorded impressions of the examiners at the time of the examination as to the development of individuals indicate that about one-third of the fourteen-year-old mill boys were physically undeveloped for the age claimed. To some extent this showing may be due to successful falsification of age, but it cannot of course be attributed to an occupation which the boy was just entering.

Between fifteen and sixteen years of age, on the other hand, the mill boys compare favorably with the New York boys in height, exceed them in weight, allowing for the shoes and clothing of the latter, and in average weight even exceed Dr. Sargent's select class. From sixteen years on, however, the average of the mill boys is increasingly unfavorable in comparison with the other classes for whom measurements are available. Even taking the figures for the cotton mill boys themselves, the sixteen-year-old boys show a gain of only .64 of an inch in average height over the fifteen-year-old boys, and an actual decrease of 2½ pounds in average weight.

In connection with the table of physical defects shown farther on in this report, it appears that at the time of their examinations 193 of the 679 boys impressed the examiners as being conspicuously undersized. It is also to be noted from this table that the proportion of undersized boys decreases as length of employment in cotton mills increases. Among the undersized boys two types were in evidence. One type well formed physically but developing more slowly than perhaps the average boy does at the ages of the boys included in this investigation; this type of boy, undersized at fourteen, may be at twenty-one physically superior to the one whose growth about fourteen was more rapid. The other type of undersized was a degenerate physical type in which normal physical development could never be hoped for.

There are few opportunities for employment open to an undersized boy of fourteen. The cotton mill, however, may offer such an opportunity, and perhaps the only one in a cotton manufacturing center. Undersized boys at fourteen who go to work at that age therefore naturally tend to show up in the mills. Under the laws of the State, boys, no matter how robust, are, until they are sixteen, shut out from all "full-time" occupations, including the more attractive trades. The cotton mills, however, offer employment to boys who for one reason or another may leave school before they are sixteen, and so as a result there is an accumulation in the cotton mills of strong husky boys just under sixteen. This fact is reflected in the tables by the high average height and weight of the boys between fifteen and sixteen years old who were examined. After reaching sixteen this type tends to disappear from the industry, leaving a preponderance of those whose occupational possibilities are limited by their lack of physical strength.

In this investigation no attempt was made to consider the female minor in the cotton manufacturing industry, but it seems fair to assume that with them the cotton mill is likely to represent a more permanent vocation.

In the matter of chest measure, the only figures available in the tables for comparison with the cotton mill boys are those of Dr. Sargent's students. It is to be noted that the cotton mill boys show much wider variations in this respect than the students, and that for all ages the average chest measures of the cotton mill boys are below those of the students. This difference, it is believed, is to be adequately accounted for by the class of the population from which the majority of the boys in each instance may be expected to have been drawn. Even in the physical examinations which officers of the Public Health Service at Boston are making of applicants for appointment in the United States Civil Service, candidates for appointment to professional positions run markedly taller, heavier, larger in chest measure, and bigger in muscular development than candidates for positions as mechanics, laborers or clerks.

In the matter of grip test, as indicated by the Collin's dynamometer, no figures could be found for purposes of comparison. This instrument is really designed for the detection of pathological conditions rather than for comparative strength tests, and, moreover, for the mere purpose of testing the strength of grip the type of dynamometer used is not entirely fair, as the amount it can be made to register will depend more or less on the size and shape of the hand and toughness of the skin. It is believed, however, that such dynamometer tests in an investigation of this character may be made to serve a useful purpose,. particularly if individual instances of marked deviations from the average be studied. In connection with the dynamometer tests in this investigation some features of possible interest were brought out which it is difficult to show by tables; for instance, before many physical examinations had been made the examiners came to expect a fourteen-year-old boy, regardless of size, to register 23 kilos on the dynamometer. The final tabulation shows this to be very close to the average for this age. A small, well set up boy, even though he might be characterized as undersized, the examiners came to expect to make as good a showing with the dynamometer as a bigger boy of the same age who gave indications of growing more rapidly. The high records on the dynamometer, the maxima recorded in the tables, are due to a few stray boys of extraordinary development and strength for their ages. Partly as the result of the dynamometer test the examiners were often led to regard the physical welfare of big, soft, rapidly growing boys as deserving of even more careful attention than others who might justifiably be called undersized.

## EDUCATION.

The education that the boys of the different ages and racial or national extractions had received is shown in the following tables, Nos. 12, 13, 14 and 15. Each boy's ability to read or tell letters was brought out in the course of the eyesight examination. This examination included tests for distance with large letters and reading fine print in English or other languages. Foreign boys were tested in their own languages as well as in English, and the boys stated to be illiterate could neither read nor name letters in

English nor in any foreign language. Most, if not all, illiterates claimed that they were attending evening schools.

In these tables the education of the boys is shown with reference to the grading of Massachusetts schools, which nearly all the boys had attended. In the few cases in which education had been completed elsewhere in this country, or in a foreign country, the boy is credited with the Massachusetts equivalent as nearly as it could be determined.

### TABLE No. 12. — *Fourteen to Fifteen Years of Age.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | LAST SCHOOL GRADE ATTENDED. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | High School. | Graduate High. | Night School. | Commercial School. | Illiterate. |
| French Canadian, | 47 | - | - | - | 6 | 14 | 13 | 10 | 3 | 1 | - | - | - | - |
| Portuguese, | 11 | - | - | 1 | 2 | 1 | 3 | 3 | 1 | - | - | - | - | - |
| English, | 18 | - | - | - | - | 2 | 6 | 3 | 7 | - | - | - | - | - |
| Irish, | 17 | - | - | - | 1 | 2 | 4 | 3 | 4 | 2 | - | 1 | - | - |
| Greek, | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Italian, | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| Polish, | 9 | - | - | - | 1 | 3 | 2 | - | 2 | 1 | - | - | - | - |
| American, | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Miscellaneous, | 3 | - | - | - | - | 1 | - | 2 | - | - | - | - | - | - |
| Totals, | 107 | - | - | 2 | 10 | 23 | 28 | 21 | 17 | 4 | - | 1 | - | 1 |

### TABLE NO. 13. — *Fifteen to Sixteen Years of Age.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | LAST SCHOOL GRADE ATTENDED. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | High School. | Grad-uate High. | Night School. | Com-mercial School. | Illiter-ate. |
| French Canadian, | 58 | 1 | 1 | 4 | 6 | 10 | 11 | 11 | 12 | 2 | - | - | - | - |
| Portuguese, | 11 | 1 | - | - | 4 | 4 | 1 | - | - | - | - | 1 | - | - |
| English, | 35 | - | - | - | - | 6 | 9 | 9 | 8 | 3 | - | - | - | - |
| Irish, | 14 | - | - | - | 1 | - | 4 | 1 | 5 | 3 | - | - | - | - |
| Greek, | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Italian, | 2 | - | - | - | 1 | - | 1 | - | - | - | - | - | - | - |
| Polish, | 16 | - | - | - | 1 | 2 | 3 | 6 | 3 | 1 | - | - | - | - |
| American, | 4 | - | - | - | - | 1 | - | 2 | 1 | - | - | - | - | - |
| Miscellaneous, | 7 | - | - | - | - | 1 | 1 | 4 | 1 | - | - | - | - | - |
| Totals, | 147 | 2 | 1 | 4 | 13 | 24 | 30 | 33 | 30 | 9 | - | 1 | - | - |

### TABLE NO. 14. — *Sixteen to Seventeen Years of Age.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | LAST SCHOOL GRADE ATTENDED. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | High School. | Graduate High. | Night School. | Commercial School. | Illiterate. |
| French Canadian, | 103 | – | 4 | 5 | 18 | 24 | 21 | 14 | 11 | 5 | – | – | – | 1 |
| Portuguese, | 37 | 1 | – | 3 | 6 | 8 | 3 | 2 | 2 | – | – | 4 | – | 8 |
| English, | 21 | – | – | – | 1 | 2 | 6 | 8 | 2 | 2 | – | – | – | – |
| Irish, | 28 | – | – | – | 3 | 3 | 4 | 6 | 6 | 6 | – | – | – | – |
| Greek, | 3 | – | – | – | – | 1 | – | – | – | – | – | 2 | – | – |
| Italian, | 2 | – | – | – | – | 1 | 1 | – | – | – | – | – | – | – |
| Polish, | 20 | – | – | – | 2 | 1 | 2 | 3 | 9 | 3 | – | – | – | – |
| American, | 4 | – | – | – | – | – | 4 | – | – | – | – | – | – | – |
| Miscellaneous, | 9 | – | – | – | – | 2 | 1 | 2 | 2 | 2 | – | – | – | – |
| Totals, | 227 | 1 | 4 | 8 | 30 | 42 | 42 | 35 | 32 | 18 | – | 6 | – | 9 |

### TABLE NO. 15. — *Seventeen to Eighteen Years of Age.*

| RACIAL OR NATIONAL EXTRACTION. | Number examined. | LAST SCHOOL GRADE ATTENDED. | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | High School. | Graduate High. | Night School. | Commercial School. | Illiterate. |
| French Canadian, | 83 | 1 | 2 | 8 | 11 | 19 | 13 | 13 | 6 | 8 | – | – | 1 | 1 |
| Portuguese, | 33 | – | – | 3 | 4 | 5 | 3 | – | 1 | 1 | – | 9 | – | 7 |
| English, | 22 | – | – | – | 1 | 2 | 2 | 5 | 7 | 5 | – | – | – | – |
| Irish, | 28 | – | – | – | – | 2 | 5 | 7 | 4 | 9 | – | – | 1 | – |
| Greek, | 7 | – | 2 | – | – | – | – | – | – | – | – | 3 | – | 2 |
| Italian, | 2 | – | – | – | – | – | – | – | – | – | – | 2 | – | – |
| Polish, | 8 | – | – | – | – | – | 3 | – | 2 | 1 | – | 2 | – | – |
| American, | 9 | – | – | – | – | 2 | 2 | 2 | 2 | 1 | – | – | – | – |
| Miscellaneous, | 6 | – | – | – | – | – | – | 1 | 2 | 3 | – | – | – | – |
| Totals, | 198 | 1 | 4 | 11 | 16 | 30 | 28 | 28 | 24 | 28 | – | 16 | 2 | 10 |

Massachusetts declares that every child has the right to an education, and has not only made adequate provision for the school education of every child in the State at public expense, but has adopted carefully devised legal measures for assuring school attendance either under public or private instruction. Most of the boys encountered in this investigation if not born in the State at least came into the State early enough in life to take advantage of all the opportunities for an education that Massachusetts offers. In Massachusetts the average school boy has reached the eighth grade of school by the time he is fourteen, the age at which he is first permitted to do any work which may conflict with school attendance. Among the 679 boys included in this investigation there were 59 who had attended high school and 2 who had attended commercial schools. As has already been mentioned, a considerable number of the boys examined during the summer months had not completed their education, but were merely working during their vacation, and intended to return to school when the schools opened in the autumn. Yet the tables show that of the boys examined, practically all of whom must have passed fourteen years of age before going to work, 237 had not even succeeded in reaching the sixth grade of a Massachusetts grammar school or its equivalent, and that 11 were so illiterate that they could not read a word or name a letter in English or any other language.

There are undoubtedly many good reasons why the education of these 237 boys ended where it did. From the tabulation of diseases and defects shown in another part of this report it will appear that some had serious unrecognized defects of eyesight incompatible with progress in school. Some were deaf. Some evidently had during their school days diseased conditions of the nose, throat and mouth, or other neglected physical defects, which must have made school life a torture. Others — just how many cannot be stated from this investigation, but by no means a small number — simply lacked the mental capacity to go any farther in school than they did. In some instances it was brought out in the investigation that the mental defectiveness had already been recognized, and the boys had been put in special classes for defectives. Most of the illiterates, both foreign and native, were abnormal, and their illiteracy was due to a lack of capacity to learn to read under ordinary methods of instruction. None of the illiterates showed physical defects sufficient to explain their illiteracy.

## PHYSICAL DEFECTS AND DISEASES.

While there appears to be no data available for the purposes of a direct comparison of the relative frequency of the diseases and defects found in this investigation, and the same diseases and defects in other occupations, or among boys of the same ages in the general population in Massachusetts, it would seem perfectly fair in this connection to consider the following list of the diseases and defects disclosed by the examination of 30,244 children fourteen and fifteen years of age who applied for employment certificates in New York City between Jan. 1 and Sept. 30, 1915. These figures have been made available through the courtesy of the Director of the Bureau of Child Hygiene of the Department of Health of New York City.

TABLE NO. 16. — *Children examined.*

| | Number. | Per Cent. |
|---|---|---|
| Total number of children examined, | 30,244 | 100.00 |
| Defective nutrition, | 717 | 2.37 |
| Defective vision, | 4,574 | 15.10 |
| Acute eye diseases, | 513 | 1.30 |
| Defective hearing, | 290 | .95 |
| Defective nasal breathing, | 880 | 2.90 |
| Deformed palate, | 206 | .68 |
| Defective speech, | 11 | .03 |
| Hypertrophied tonsils, | 2,549 | 8.62 |
| Defective teeth, | 9,955 | 32.85 |
| Pulmonary disease, | 52 | .17 |
| Cardiac disease, | 351 | 1.16 |
| Diseased glands, | 5,463 | 18.06 |
| Goiter, | 198 | .65 |
| Skin diseases, | 56 | .18 |
| Pediculosis, | 88 | .29 |
| Orthopedic defects, | 165 | .54 |
| Hernia, | 34 | .11 |
| Nervous diseases, | 85 | .28 |

TABLE NO. 17. — *Showing the Diseases and Defects found among Male Cotton Factory Employees between Fourteen and Eighteen Years of Age whose Aggregate Length of Employment in the Cotton Manufacturing Industry was as indicated.*

| DEFECTS. | TOTAL DURATION OF EMPLOYMENT IN COTTON MILLS. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Less than 1 Month. | More than 1 Month, Less than 6. | More than 6 Months, Less than 1 Year. | More than 1 Year, Less than 2. | More than 2 Years, Less than 3. | Three Years or More. | Totals. |
| Total boys examined, | 18 | 202 | 77 | 179 | 125 | 78 | 679 |
| Physically undeveloped (undersized). | 7 | 73 | 27 | 58 | 18 | 10 | 193 |
| Defective vision one eye (other eye normal). | – | 12 | 4 | 18 | 5 | 10 | 49 |
| Blind one eye (other eye normal), | – | – | 2 | 2 | 2 | 1 | 7 |
| Vision less than $^{10}/_{20}$ both eyes, | 1 | 17 | 3 | 7 | 9 | 7 | 44 |
| Vision less than $^{10}/_{20}$ one eye, less than $^{20}/_{20}$ in the other. | 1 | 2 | 2 | 1 | – | 2 | 8 |
| Vision more than $^{10}/_{20}$, less than $^{20}/_{20}$ both eyes. | 3 | 11 | 6 | 20 | 16 | 11 | 67 |
| Refractive errors corrected by glasses, | – | 1 | 2 | – | 1 | 1 | 5 |
| Congestion of conjunctiva, | – | 5 | 3 | 4 | 5 | 1 | 18 |
| Follicular conjunctivitis, | – | – | – | 2 | – | – | 2 |
| Blepharitis, | – | – | – | 2 | 1 | – | 3 |
| Ptosis, | – | – | – | 1 | – | – | 1 |
| Strabismus, | 1 | 1 | 2 | 1 | – | 1 | 6 |
| Corneal opacity, | – | – | – | 2 | – | 1 | 3 |
| Trachoma, | – | – | – | – | – | – | – |
| Color blindness, | – | 1 | – | – | – | 1 | 2 |
| Deaf one ear, other normal, | 1 | 6 | 1 | 8 | 8 | 1 | 25 |
| Deaf both ears, cause not apparent, | 1 | 11 | 3 | 10 | 4 | 6 | 35 |
| Dulness of hearing, one or both ears, apparently due to cerumen plug. | 1 | 21 | 14 | 23 | 12 | 8 | 79 |
| Otorrhœa, chronic, | – | – | – | 3 | 1 | 4 | 8 |
| Acute abscess middle ear, otorrhœa, acute. | – | – | – | 1 | 1 | – | 2 |
| Deafness and polypi, ears, | – | – | 1 | 1 | – | – | 2 |
| Nasal congestion, | 3 | 19 | 9 | 12 | 9 | 2 | 54 |
| Chronic nasal catarrh, | – | 3 | 1 | 2 | 4 | 2 | 12 |
| Spurs, | 1 | 14 | 6 | 5 | 8 | 4 | 38 |
| Deflected septum, | 1 | 6 | 5 | 13 | 7 | 3 | 35 |
| Acute inflammation, nose and throat. | 3 | 36 | 13 | 32 | 26 | 9 | 119 |
| Coryza, | – | 7 | 1 | 5 | 8 | 1 | 22 |
| Pharyngitis, | 1 | 25 | 7 | 30 | 18 | 7 | 78 |

TABLE No. 17. — *Showing the Diseases and Defects found among Male Cotton Factory Employees between Fourteen and Eighteen Years of Age whose Aggregate Length of Employment in the Cotton Manufacturing Industry was as indicated* — Continued.

| DEFECTS. | TOTAL DURATION OF EMPLOYMENT IN COTTON MILLS. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Less than 1 Month. | More than 1 Month, Less than 6. | More than 6 Months, Less than 1 Year. | More than 1 Year, Less than 2. | More than 2 Years, Less than 3. | Three Years or More. | Totals. |
| Laryngitis, | – | – | – | – | 1 | 1 | 2 |
| Adenoids, | – | 11 | 1 | 4 | 2 | 3 | 21 |
| Nasal polypi, | – | 1 | – | – | 1 | – | 2 |
| Deformed palate, | – | 1 | – | 6 | – | 5 | 12 |
| Tonsils slightly enlarged, | 3 | 48 | 20 | 42 | 28 | 15 | 156 |
| Tonsils moderately enlarged, | 5 | 23 | 10 | 21 | 16 | 8 | 83 |
| Tonsils greatly enlarged, | – | 6 | 1 | 10 | 3 | – | 20 |
| Acute tonsillitis, | – | 1 | – | – | – | – | 1 |
| Tongue badly coated, | – | – | 1 | – | 1 | – | 2 |
| Tongue slightly coated, | 2 | 37 | 12 | 31 | 20 | 17 | 119 |
| Decaying teeth, | 8 | 131 | 41 | 102 | 69 | 37 | 388 |
| Unclean teeth, | 10 | 111 | 46 | 119 | 61 | 35 | 382 |
| Filled teeth, | 1 | 19 | 8 | 10 | 16 | 10 | 64 |
| Missing teeth, | 9 | 97 | 33 | 82 | 51 | 45 | 317 |
| Alveolar abscess, | – | – | – | 1 | – | 1 | 2 |
| Deformity of chest, | 1 | 3 | 5 | 4 | 4 | 4 | 21 |
| Acute bronchitis, | – | 4 | – | 3 | 3 | 1 | 11 |
| Thickened pleura, | – | – | – | 1 | – | – | 1 |
| Pleurisy with effusion, | – | 1 | – | – | – | – | 1 |
| Pulmonary tuberculosis, | – | – | – | – | – | – | – |
| Organic disease of heart, | – | – | – | 1 | 1 | 1 | 3 |
| Functional disorder of heart, | – | 2 | 1 | 6 | 5 | 4 | 18 |
| Pericarditis, | – | – | 1 | – | – | – | 1 |
| Anæmia, | 3 | 7 | 4 | 8 | 6 | 6 | 34 |
| Enlarged occipital glands, | 2 | 4 | 5 | 3 | 2 | 1 | 17 |
| Enlarged cervical glands, | 4 | 58 | 19 | 53 | 40 | 14 | 188 |
| Enlarged axillary glands, | 7 | 53 | 27 | 50 | 44 | 15 | 196 |
| Enlarged submaxillary glands, | – | 1 | – | – | – | 1 | 2 |
| Enlarged epitrochlear glands, | – | – | – | 1 | – | 1 | 2 |

TABLE NO. 17. — *Showing the Diseases and Defects found among Male Cotton Factory Employees between Fourteen and Eighteen Years of Age whose Aggregate Length of Employment in the Cotton Manufacturing Industry was as indicated* — Continued.

| DEFECTS. | TOTAL DURATION OF EMPLOYMENT IN COTTON MILLS. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Less than 1 Month. | More than 1 Month, Less than 6. | More than 6 Months, Less than 1 Year. | More than 1 Year, Less than 2. | More than 2 Years, Less than 3. | Three Years or More. | Totals. |
| Inflamed or suppurating lymph glands. | – | – | – | – | – | – | – |
| Scars from former disease, lymph glands. | – | 4 | – | 1 | – | 1 | 6 |
| Goiter, simple, . . . . . | – | – | 1 | 1 | – | – | 2 |
| Pediculosis scalp, . . . . . | – | – | – | – | 1 | – | 1 |
| Ringworm of scalp (*tinea tonsurans*), | – | – | 1 | – | – | – | 1 |
| Seborrhœa, . . . . . . | – | – | – | – | – | – | – |
| Eczema, . . . . . . . . | – | – | – | – | – | – | – |
| Pediculosis, body, . . . . . | – | – | – | – | – | – | – |
| Ringworm of face (*tinea circinata*), | – | 1 | – | – | – | – | 1 |
| Furuncles (boils), . . . . . | – | 1 | – | 1 | 2 | – | 4 |
| Acne, . . . . . . . . | 1 | 14 | 5 | 19 | 9 | 11 | 59 |
| Psoriasis, . . . . . . . | – | – | – | – | – | – | – |
| Dermatitis, hands or body; dermatitis, forearms from soap. | – | – | 1 | – | – | – | 1 |
| Scoliosis, . . . . . . | – | – | – | 1 | – | – | 1 |
| Active tuberculosis of bones or joints, | – | – | – | – | – | – | – |
| Results of former tuberculosis of vertebræ (Pott's disease). | – | – | – | – | 2 | – | 2 |
| Results of former tuberculosis of other bones or joints. | – | – | – | – | – | – | – |
| Deformities resulting from rickets, | – | – | 1 | – | – | – | 1 |
| Round shoulders, . . . . . | 2 | 3 | 5 | 11 | 7 | 4 | 32 |
| Mutilations or deformities resulting from occupational accidents. | – | – | – | 2 | – | – | 2 |
| Bursitis, . . . . . . . . | – | – | – | 1 | – | 1 | 2 |
| Knock knees, . . . . . . | – | 1 | – | – | – | – | 1 |
| Bow legs, . . . . . . . | – | – | – | – | – | – | – |
| Poor arches of feet, . . . . . | – | 6 | 2 | 6 | 7 | 1 | 22 |
| Flat feet, . . . . . . . | – | 1 | – | – | – | – | 1 |
| Hernia, . . . . . . . . | – | 1 | – | 2 | – | – | 3 |
| Varicose veins, . . . . . | – | – | – | – | – | – | – |
| Chronic disease of alimentary tract suspected. | – | – | – | – | – | – | – |
| Chronic appendicitis suspected, . | – | – | 1 | – | – | – | 1 |

TABLE No. 17. — *Showing the Diseases and Defects found among Male Cotton Factory Employees between Fourteen and Eighteen Years of Age whose Aggregate Length of Employment in the Cotton Manufacturing Industry was as indicated* — Concluded.

| DEFECTS. | TOTAL DURATION OF EMPLOYMENT IN COTTON MILLS. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Less than 1 Month. | More than 1 Month, Less than 6. | More than 6 Months, Less than 1 Year. | More than 1 Year, Less than 2. | More than 2 Years, Less than 3. | Three Years or more. | Totals. |
| Intestinal parasites suspected, . | – | 1 | 2 | 3 | 1 | – | 7 |
| Deformity of partial anchylosis resulting from former injuries to bones or joints. | – | 1 | 2 | 3 | 3 | – | 9 |
| Nephritis, . . . . . . | – | – | – | 1 | 1 | 1 | 3 |
| Temperature above normal, . . | – | 6 | 1 | 3 | – | 1 | 11 |
| Lead or chemical poisoning suspected. | – | – | – | – | – | – | – |
| Slight facial paralysis, . . . | – | – | – | 1 | – | – | 1 |
| Mental defectiveness suspected, . | 1 | 7 | 4 | 11 | 9 | 1 | 33 |
| Total defects, . . . . | 84 | 937 | 373 | 878 | 579 | 339 | 3,190 |
| Mucous membrane, nose and throat absolutely normal. | 14 | 142 | 56 | 136 | 88 | 83 | 499 |

*Practical Significance of the Defects shown in Table No. 17.*

*Physically undeveloped.* — The figures given in the table in connection with this term represent the personal impressions of the examiners from the appearance of the individual boys after considering the alleged age and average development of other boys of the same age. This matter has already been discussed in connection with the physical measurements of the boys.

*Eyesight.* — In the actual examination an effort was made in each case of defective vision to determine the extent and character of the defect as approximately as could be done without the use of a mydriatic, but, as in other instances in which it was attempted to rely on the testimony of the boys as to subjective phenomena, conclusions were so often open to question that in the table there is only shown the defectiveness of vision for distance as indicated by the Snellen type tests. It may be stated, however, that in a number of instances there was an evident hypermetropia when the letters on the test card could be read at the distance for normal. It is also to be stated that among the 44 reported in the table to have vision for distance less than $^{10}/_{20}$ in both eyes are a number who showed evidence of most serious abnormalities of the retina and choroid, that is, of the light-perceiving structures of the eye, and in whom the preservation of even their present degree of vision presents a difficult problem. As it happened, no boy with abnormal eyes was found doing work which seemed likely to subject his eyes to any more injurious strain than that to which they would be subjected if he were to be thrown out of work and left to his own devices. Except in a comparatively few special tasks the chances for eye strain were incomparably less than studying in school would involve, and the boys engaged in these special tasks were found either to have normal eyesight or to be properly fitted with glasses. Defects of vision were, however, found that were of serious importance. Persons with the high degree of nearsightedness which some of these boys showed find that while bothered in seeing at any distance without glasses they possess microscopic powers of eyesight for close work, and tend to neglect glasses and drift into occupations requiring close, constant application of the eyes; yet such use of their eyes without glasses involves a strain and congestion of their abnormal eye tissues productive of degenerative changes and blindness. The dangers just described do not necessarily apply to all of the 44 whose vision in both eyes is shown in the table as less than $^{10}/_{20}$, but all of these, as well as many of the rest of the 175 whose eyesight was found to be abnormal, should be wearing carefully fitted glasses if they are to make the most of their possibilities as wage earners, or otherwise. Of all found with defective eyesight only 5 were found to be provided with suitable glasses. Some wore glasses which did them little or no good, but most either never had worn glasses or had abandoned their use.

The examiners endeavored to impress upon a boy the necessity of wearing glasses whenever it seemed advisable that he should wear them, but it soon became evident that there are practical difficulties in the way of securing the results to be desired. To families to which many of the boys belonged the cost of suitable glasses for children with the refractive errors found is in itself prohibitive. Then, too, in some instances the boys frankly said that they would not wear glasses, both because they were a nuisance and because other boys would laugh at them. The agent of one mill met the situation for the time being by having fitted and provided with suitable glasses at his own expense all boys in his employ whom the examiners recommended should wear glasses, but in the natural course of events most of these boys will have gone into some other occupation within a year, and their places will be taken by others with similar needs. It is perhaps of interest to note that cases of defective vision were much more common among the French Canadians than the other nationalities examined.

In the foregoing, defects of eyesight due to congenital abnormalities of the eyes are alone considered. A few of the cases of "defective vision one eye" reported in the table, and a few of those "blind one eye," were due to injuries. None of such injuries had, however, been received during employment in cotton mills. One case of blindness in one eye was due to an albuminuric retinitis associated with chronic nephritis (Bright's disease). In three instances defective vision was associated with corneal opacities from former corneal ulcers of unknown cause. Not a single case of trachoma or other contagious eye affection was found. Only two cases of color blindness were found, although defects in color perception were looked for with special care, particularly after it was seen that the examination was revealing no more cases.

*Hearing.* — The only feature of their work which any of the boys complained of was the noise of the mill. This is incessant, and particularly in the weaving rooms it is such as to make an attempt at conversation on the part of a visitor exceedingly difficult. Complaints, however, came only from those who had been employed but a comparatively short time. Those employed longer said they "got used to the noise." It was found impracticable to undertake any careful investigation into the character and extent of any possible occupational deafness arising from this cause. In the detached buildings where examinations were made it was usually not quiet enough for careful auditory tests. Then, too, in conducting these physical examinations it soon became apparent that, partly from lack of intelligence and partly from apprehension regarding possible motives for the examinations, it was unsafe to rely on the testimony of the boys as to subjective phenomena or symptoms for any purpose whatever.

In the hearing tests the ticking of watches was relied upon. Two watches were used. Both were standardized, one by several thousand previous physical examinations. The examiner's own hearing had also been found normal. In testing the hearing of a boy the examiner stood directly behind the boy, the examiner placing his own ear as near the boy's as possible and listening to the ticking of the watch also. Apparent dulness of hearing to the ticking of a watch was quite common. It soon became evident that to some extent this dulness was only apparent, and was due to lack of the mental concentration required to listen to faint sounds. After a little encouragement and experimentation it was found that many of these boys with apparent dulness of hearing could actually hear the watch as far away from the ear as the examiner could. Often boys whose hearing for the watch was dull claimed that they were conscious of being "deaf," as they put it, when they first came out of the mill, but that they could "hear as well as ever in an hour or so." On the other hand, boys employed as weavers, who had worked in the mill for three years and who came directly from the weaving room to their examinations, were found to have an acuteness of hearing for the ticking of a watch equal to that of the examiners. The external auditory canal of every boy was examined, a DeZeng otoscope being used for this purpose, and unless a view was obstructed by cerumen or abnormal growths the ear drum itself was inspected. As might be inferred from the number of cases of an abnormal condition of the upper respiratory passages, this inspection of the auditory canal often showed at once sufficient evidence of old middle ear disease to account for the degree of deafness observed. As appears from Table No. 17 there were found at the time of the examination, complicating abnormal throat and nose conditions, 2 cases of acute middle ear abscesses and 8 cases of chronic otorrhœa. As indicated by the table, in 79 instances a dulness of hearing seemed adequately explained by the accumulation of a plug of cerumen or "wax" in the auditory canal. No statistics are available as to the prevalence of this condition in the general population for purposes of comparison, but the frequency with which cerumen accumulations to an extent unquestionably involving interference with hearing was found among the boys arouses a suspicion that there may be an explanation in the occupation, or in some habit or practice among mill employees, favoring the accumulation of cotton "fly" in the ears and promoting the formation of "wax plugs."

While many cases of impaired hearing were clearly due to the causes above described, and while failure of the examination to reveal the results of some former inflammatory trouble unrelated to the occupation does not mean that some such condition may not have been the cause of impaired hearing, there still remains enough in these unexplained cases of dulness of hearing to indicate that the noise of the cotton mill may so affect the inner ear as to cause a so-called "occupational deafness." This is really no more than might be expected. That such an effect, however, does not necessarily follow was shown by the fact that persons who had been employed longer under the same conditions, some of them players of musical instruments, showed no discoverable impairment of hearing whatever. As to the danger of jumping at conclusions in individual cases the following may be cited. In one mill six weavers, the first weavers in that mill to be examined, were sent into the examination room together. Four of these were found to be markedly deaf, and the acuteness of hearing of the other two to the ticking of a watch was at least as good as that of the examiners. Of the four all were found on examination, confirmed by history, to be deaf from serious middle ear trouble antedating their employment in any occupation.

*Nose, Mouth, etc.* — In making the physical examinations of the boys the mucous membrane of the upper air passages and throat was carefully inspected with special reference to securing and tabulating data which might tend to indicate any irritant effects of the atmosphere of the mills, or of gases or chemical vapors, upon the respiratory tract. Anything in the way of an abnormal appearance was noted. Yet in spite of the fact that in three mills, including the largest investigated, there were encountered epidemics of acute colds prevalent at the same time in the general population, there still remain out of the 679 boys, 499 whose respiratory mucous membrane was free from discoverable abnormality. In a great many instances a congestion or inflammatory condition was obviously due to an acute infective process, but in such cases, as well as when the cause of congestion might be open to question, an effort was made to see if a possible relation could be traced between the department of the mill or the boy's special occupation and an abnormal appearance of the mucous membrane of the nose or pharynx. The result was in all instances absolutely negative. Even in the case of boys from the carding rooms, where the air often appeared dusty from floating lint or "fly," signs of irritation or congestion of the nose were more often absent than present. As indicated by the table, however, this examination did reveal a number of more or less serious conditions of the upper air passages.

Many of the boys had at some time previously been operated on for hypertrophied tonsils and excessive adenoid growths. In many if not most of the cases noted as having "slightly enlarged tonsils" the hypertrophy was probably of no serious practical importance. In some of these cases an acute cold was also present. But even in these cases of slight tonsillar hypertrophy there was often an association with decaying teeth suggesting that tonsils were being overworked to take care of the products of bacterial growths in the mouth. Practically all of the 103 cases noted as having "moderately" or "greatly enlarged tonsils," are, however, to be regarded as worthy of serious consideration. In some instances they were associated with other throat or nose conditions likewise calling for attention. They were almost invariably associated with decaying teeth. They were associated with the three cases of organic heart disease found, and in two of the cases there was a history indicating an endocarditis following recurrent attacks of tonsillitis. In many instances these enlarged tonsils were associated with a general physical appearance indicative of systemic poisoning.

*Teeth and Tongue.* — It is worthy of note that but two instances of "badly coated tongue" were found, both apparently due to some acute disorder of the digestive system. The cases of "slightly coated tongue" were almost invariably associated with bad teeth, and probably in most instances represented a permanent condition.

The prevalence of dirty, decaying and otherwise neglected teeth was the most striking feature of the whole investigation. Inquiry showed that the habitual use of a toothbrush was limited to a comparatively few boys, and that even an occasional use of a toothbrush was comparatively uncommon. Of the 679 boys, 388 had decaying teeth demanding the immediate attention of a dentist. In a still greater number of boys a more careful examination of the teeth than was attempted would undoubtedly have revealed beginning decay. Boys who had not reached seventeen years of age were found practically without a sound tooth in their mouths. The importance of diseased and inefficient teeth, and of the absorption of the toxic products of bacterial growths in these foul mouths, as factors in the production of such evidence of malnutrition and anæmia as was found cannot be overestimated. In every instance when a boy was found to have decaying or neglected teeth he was given a lecture on the importance of attention to his teeth. When a boy's teeth were found clean or with cavities filled, the fact was commented on for the benefit of other boys present. In such a case the boy was usually asked who made him take care of his teeth. The invariable response was, his mother. Efforts of the examiners to arouse the boys' interest in the care of their teeth brought out the following information regarding the character of the problem of bringing about better mouth conditions among boys of the type represented. In many instances there was disclosed such an indifference on the part of the boys and their parents to the preservation of teeth that probably nothing short of some form of compulsion would bring about any effort to improve conditions. When a tooth became too painful to be endured it would be extracted. Three hundred and seventeen boys had had teeth extracted. Only 64 had had teeth filled. There is, however, another important phase of this problem, suggested by the remarks of a boy whose attention was called to the fact that while some of his teeth were properly filled there were others still needing attention. He said, "There are four of us children in the family, and I have just had $40 spent on my teeth, and now I have got to wait for a while." The fact is that in many instances the cost of the dental work now necessary to save the teeth would be prohibitive. Even slight attention to teeth also usually means absence from work and loss of pay. On completion of their examinations of the boys of a mill the examiners were usually asked by the agent or treasurer if they had any suggestions to make in the way of promoting the physical welfare of the employees. In response to such a request one treasurer was advised to secure the establishment of a well-equipped evening dental clinic in the city, and he promptly acted on the suggestion.

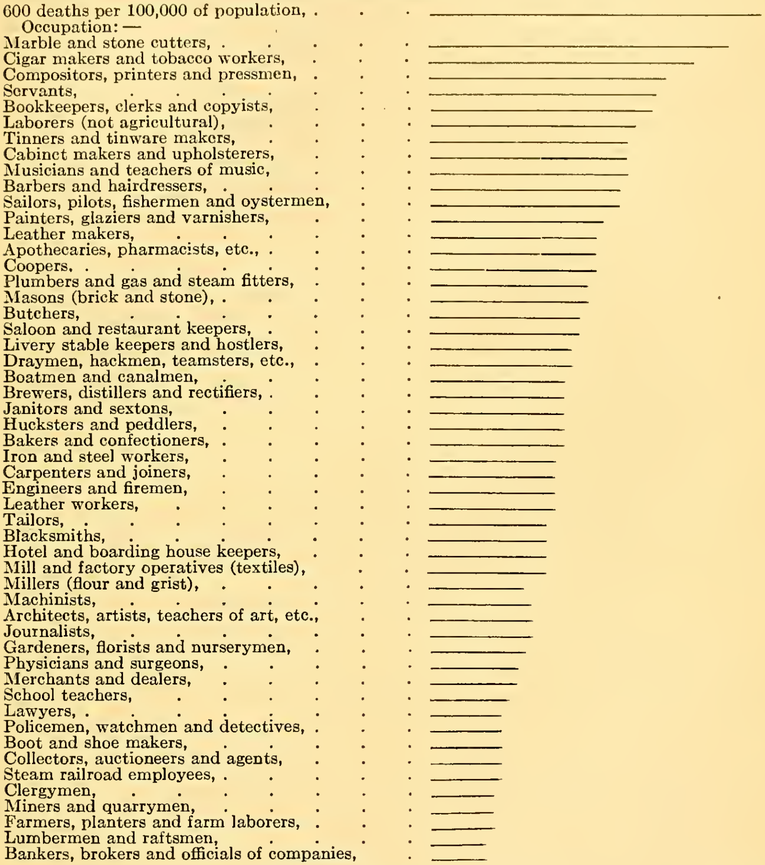
*Lungs and Heart.* — As indicated in the table, 21 of the boys had malformations of the chest sufficiently pronounced to be deemed worthy of note. So far as could be determined all these malformations were congenital in origin. There was no case in which there was evidence of a former empyema. One case of pleurisy with effusion was discovered. This boy, robust in appearance, had been at work in the mill but two weeks, and gave a history of a cold and cough beginning prior to his coming to his employment in the mill. At the hospital to which he was referred by the mill management tuberculous infection could not be demonstrated. Eleven cases of slight acute bronchitis were found, all associated with the acute colds to which reference has been made in the foregoing. Not a single case of tuberculosis of the lungs was found. In four cases the physical examinations of the chests revealed symptoms which were deemed sufficient to warrant further investigation as to the possibility of tuberculous infection, but in all such, investigation failed to confirm suspicions. While pulmonary tuberculosis would not be expected to be found very common among any individuals of the ages of those examined, there is a noteworthy absence of other evidence of tuberculous infection. There were no cases of actively inflamed or suppurating lymph glands, and but six instances in which there were scars from former disease of lymph glands. There was not a case of active disease of the bones or joints, whether due to tuberculosis or other infection. Except for two cases of deformity of the spine, presumably due to former "Pott's disease," there were seen no deformities of bones or joints which could possibly be attributed to former tuberculosis infection.

So far as pulmonary tuberculosis is concerned the absence of active cases among 679 boys, all under eighteen years of age, few of whom had worked in the industry more than four years, and nearly half of whom less than a year, is of little value as evidence in tending to indicate whether cotton mill work predisposes to pulmonary tuberculosis or not. Of possible interest, however, in this connection there is inserted below a chart taken from a report on tuberculosis in the United States, prepared by the United States Bureau of Census for the International Congress on Tuberculosis at Washington in 1908.

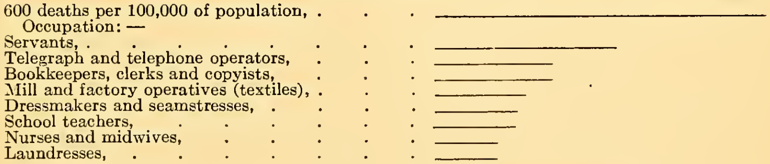
TABLE NO. 18. — *Relative Proportion of Deaths per 100,000 of Population from Pulmonary Tuberculosis among Persons Ten Years of Age and Upward in Specified Occupations.*

[United States Census, 1900.]

*Male.*



*Female.*



*Heart.* — Three cases of organic disease of the heart were found, all, as already mentioned, associated with diseased tonsils. There was also one case of a subacute pericarditis found, likewise in a boy with bad teeth and diseased tonsils.

Eighteen cases of functional disorders of the heart were found, six of them in one mill. The causes of these conditions cannot be stated in all cases. The boys were not inclined to help out in a line of inquiry tending to reveal a possible cause in their own habits. In this investigation it soon became apparent that excessive use of tobacco was common among them, smoking both cigarettes and pipes outside the mill and chewing while at work. In none of these cases could excessive use of tobacco be excluded as a possible cause, and in a considerable number of the boys excessive tea drinking was admitted as well. One boy confessed to nine cups of "fairly strong" tea a day.

*Anæmia.* — Notwithstanding the importance, in an investigation of this character, of an actual examination of the blood of an individual, it was decided, after careful consideration, that an attempt to draw blood from a boy, even to the extent of pricking the ear for a drop or two, would be inadvisable in this State. In attempting to determine, therefore, whether or not a boy might be anæmic, recourse was had to devices made use of by officers of the Public Health Service in their line inspection of immigrants, the efficiency of which devices have been tested by subsequent actual examinations of the blood in thousands of individuals. While in the cases of some of the 34 boys noted as anæmic in the table an actual blood examination would probably show that the inference as to anæmia was unjustified, it is believed that 34 represents the maximum number of the boys whose blood by actual tests might possibly show a deficiency of hæmoglobin or of red corpuscles which could be characterized as anæmia. In practically all, if not all, the cases of boys credited as being anæmic in the table, other abnormal conditions sufficient to furnish a probable cause of anæmia were also found present. It may be noted that, according to the table, out of the 220 employed in cotton mills less than six months, only 10 were credited as anæmic, whereas of the 78 employed over three years 6 were so described. But it is also to be considered that 72 out of the 78 suggested no indication of anæmia, and that the whole investigation tended to indicate that boys who were physically weak were more likely to stay in the industry.

*Glands.* — Previous experience by officers of the United States

Public Health Service in physical examinations of children had led to a belief that a perceptible enlargement of lymph glands in children would be found on careful examination to be more frequent than is generally supposed, and the opportunity furnished by these examinations was taken for making actual findings in such a number of growing boys a matter of record. In every boy the bodily localities indicated were carefully felt, and every perceptible enlargement of a gland was recorded. While, as already stated, no sign of an inflammatory condition of lymph glands was found in any boy, the perceptible enlargement of cervical glands was in many instances probably due to diseased tonsils. The prevalence of enlarged axillary glands, often as large as a large bean and without any indication of inflammation, awaits an explanation. In no instance was there any condition about the fingers, hands or arm to suggest a cause. It also appeared extremely doubtful if the enlarged epitrochlear glands possessed their usually accepted significance.

*Skin Diseases.* — The freedom of the boys from skin diseases was remarkable. But one case of lousiness was discovered, and only two contagious skin diseases were found, one a bad case of ringworm of the scalp (*tinea tonsurans*), and one a little skin ringworm of the face (*tinea circinata*). Four boys had isolated boils. There were 59 boys who showed some facial acne (pimples), — certainly a small proportion considering the number of boys and their ages. The case of dermatitis of the hands, already alluded to, was evidently caused by a strong soap.

*Rickets.* — It is noteworthy that but one boy showed signs of former rachitis, as the hospital records of the cities in which the mills were located show that rickets must be a comparatively common affection.

*Feet.* — The feet of the boys were always carefully examined with view to the detection of any evidence of a strain from their occupation. But one case was found which could be characterized as flat foot, and even in this instance the boy denied that his feet were causing him any discomfort. The 22 cases of "poor arches of feet" noted were associated in every case with poor general physiques, and indicated rather a weakness and probable source of future trouble than an actual present trouble.

*The Digestive System.* — In the matter of food and digestion the apprehension of the boys as to possible motives of the examination made information which they supplied hardly reliable, but there was no instance in which the examiners saw reason to suspect that a boy might be suffering from lack of food. The instances of malnutrition seemed always much more probable due to malassimilation or some systemic poisoning. Objective symptoms of disease of the digestive tract were, however, absent except in the one case of suspected chronic appendicitis. The region of the appendix was invariably felt for signs of tenderness. In seven instances, from various symptoms, intestinal parasites, probably round worms (*ascarides lumbricoides*), were thought to be present. It is not believed, however, that infection with intestinal parasites was limited to these seven cases. It seems much more likely that intestinal parasites are really an important factor in accounting for the physical appearance of many of the boys.

*Bursitis.* — In one mill two "cleaners" were found to have a callous condition over the upper end of the tibia, and indications of a bursitis about the patella, or, in other words, "housemaid's knee." It was not discovered in any other mill. As usual the boys affected were not very communicative. The overseer of the room stated that it was due to working on the knees, and was a common affection in mills. "Bursitis" does not appear to be unduly prominent in records of hospital dispensary cases in cotton manufacturing centers, and whether "housemaid's knee" be an occupational hazard of the cotton mills still remains uncertain.

*Nephritis.* — Three boys were found to have chronic nephritis, or Bright's disease. In each instance it can be definitely stated that the disease antedated employment in any occupation. It can be safely assumed that in each case the disease was produced by some systemic infection. In one case the history pointed with practical certainty to an attack of scarlet fever as the cause. In the other two cases scarlet fever may also have been the cause. These two boys could not or would not give information to warrant a definite conclusion as to probable origin of the disease. But in these two cases diseased tonsils, a not unusual cause of nephritis, may have been the source of infection.

The practical question arose as to what should be done with these boys, and the mill officials concerned turned to the examiners for advice. The circumstances of each case were considered. In each case it was apparent that discharge from employment would mean merely turning the boy loose in the street with no prospect of the medical or even parental surveillance that his condition called for. In each instance retention in employment meant an opportunity for constant medical supervision by the medical staffs of hospitals in which the mills concerned were interested, and free-bed treatment in the hospitals whenever symptoms might call for it. Retention in employment also assured keeping three cases of Bright's disease in a warm equitable temperature for at least a large part of the time. The particular work at which these boys were employed seemed to be work which they would be well able to do whenever symptoms did not call for actual treatment in hospital. Under the circumstances in these three cases the mill officials were therefore advised not to discharge these three boys, but to refer them at once to the hospitals, and, as to the future, to be governed by reports from the hospital staffs regarding the physical condition of the boys and their disposition to make use of the medical care at their disposal.

*Temperature above Normal.* — Eleven boys were found to have a temperature above normal. In nearly all cases a cold or some other acute disturbance reported in the table was evidently the cause. In the remaining few cases in which a cause was not apparent from the physical examination the history indicated some acute illness of an unimportant character.

*Mental Defectiveness.* — After a brief trial an attempt to subject each boy to the same systematic routine tests of mental capacity was abandoned as impracticable for the reason that the nervousness of the boys under the physical examination and their suspicions as to its motives were found greater than was anticipated. The physical examination, however, gave an opportunity to engage the boys in conversation, and this conversation was directed in such manner as in each individual instance seemed best calculated to disclose deficiency in mental capacity. Evidence brought out in this way was confirmed by admissions of leaving school in the lowest grades because of inability to learn, even in some instances when put in "special classes," and of repeated failures to "hold jobs" after going to work. Many of the illiterates had not lacked opportunity to learn. It is believed that the thirty-three cases reported in which mental defectiveness was suspected represent a very conservative estimate of the number of boys met in this investigation who would prove to be unquestionably mental defectives in a careful mental examination.

### *Atmospheric Conditions of the Cotton Factories.*

In connection with the description of the various occupations at which the boys were found employed in the cotton factories it was stated that while in the cotton manufacturing industry male minors might be found engaged in work dangerous to their health, so far as any boys encountered in this investigation were concerned health hazards must be sought in the atmospheric conditions of the mills. Nor is there any thing brought out by the physical examinations just discussed which seems to call for a modification of this statement. The actual examinations tend rather to lessen the probability of harmful atmospheric conditions. In most of the boys physically defective the physical examination itself revealed an apparently adequate cause in no way related to the occupation. But the possibility of atmospheric conditions in the mills unfavorable to health cannot be ignored. Even if it be found that a growing boy shows congenital stigmata, or physical degeneration, has rotten teeth and diseased tonsils, chews tobacco at work, smokes, drinks tea immoderately, swallows his midday meal whole to get more time to go swimming or to play ball during the noonday recess, and together with six other persons sleeps in a small room with the windows shut at night, it does not necessarily follow that there may not be something in the atmospheric condition of the mill also tending to make him look skinny and pale. This whole investigation has tended to show that probably the majority of the boys examined compare favorably in physical development and health condition with any class of boys of the same ages from whatever environment they may come, but between individuals of the same ages striking contrasts in these respects were to be seen. While a careful study of the examination records of boys employed in mills of old and of new construction failed to suggest anything whatever of possible interest, it is a fact that marked differences in the air conditions in different mills visited did exist. It is also a fact that some individuals can apparently thrive in atmospheric conditions which to other persons are intolerable.

With the facilities at their disposal the examiners did not feel warranted in attempting to add to the voluminous experimental data which have been accumulated with respect to the value for breathing purposes of gaseous mixtures that have passed through the systems of other persons, or as to the effect on bodily nutrition of varying degrees of temperature and percentages of relative humidity. Effort was made, however, to secure some idea of the air conditions in the mills, and the following observations are submitted for such consideration as they may appear to deserve: —

*Dust.* — As has already been stated, the opening of the cotton bales and the "picking" operations may be attended with the production of a good deal of dust of diverse origin. The "picking" process need not necessarily be dusty, and it was so safeguarded in some mills visited as not to be noticeably dusty. Aside from the opening and picking processes cotton manufacturing is not a dusty occupation, except for the fine cotton fibers or "fly" in the air. The floors are always more or less oily from drippings from the machinery. A certain amount of moisture in the air and freedom from strong draughts are essential to the industry, so that sweeping, even though it be done with ordinary brooms, does not seem to stir up much dust. Atmospheric cleanliness, so far as extraneous matter is concerned, is a recognized factor in cloth production.

It is now known that it is not the amount but the character of dust which determines its harmfulness and its ability to damage and predispose to infection of the respiratory tract. Tuberculosis among soft coal miners is remarkably infrequent, though their lungs may be found actually black from the coal dust they have inhaled. Other classes of miners, granite cutters, or others who constantly inhale dust containing hard, sharp particles of silicon compounds, or persons who inhale hard, sharp dust of other materials, cannot hope to escape diseased lungs, even if they may escape tubercular infection. The fine cotton fiber so conspicuous in the air of the mills appeared not to be so irritating as might be supposed. Collected by one of the examiners and placed experimentally in his eye, it produced but slight discomfort, and even this indication of irritant effect on the conjunctiva soon disappeared, apparently as soon as the cotton fiber became thoroughly moistened. This cotton fiber or "fly" was constantly found in considerable amounts in the nostrils of the mill boys, but was never detected any distance back in the nose. It does not on this account necessarily follow, of course, that "fly" might not get into the larynx or even the bronchi of a boy to a considerable extent. The boys could not be expected to breathe exclusively through their noses. Then, too, while cases of defective nasal breathing were uncommon, they were found. But moisture seemed to be a great factor in arresting the progress of cotton fly toward the lungs, and the respiratory mucous membrane of the boys was usually found to be noticeably moist, owing, it was supposed, to the tendency of the mill's atmospheric humidity to check evaporation. The mill dust does not, of course, consist exclusively of cotton fly, but in spite of colds and various abnormalities not possibly attributable to mill conditions there still remained 499 out of the 679 boys whose respiratory mucous membrane showed no discoverable abnormality, and this fact alone would seem to justify some skepticism as to the harmfulness of ordinary cotton mill atmosphere to the human respiratory apparatus.

*Ventilation.* — The mills visited included those of both modern and ancient construction. One of the largest was built prior to 1840, and there were several over forty years old. In some mills or parts of mills of modern construction a remarkable efficiency in ventilation had been attained. In all the older mills or portions of mills comparatively recent efforts to improve ventilation were in evidence. The construction of some of these buildings made satisfactory ventilation a very difficult problem; but so far as giving opportunity for satisfactory ventilation, arrangements so far as observed appeared to be adequate if intelligently utilized.

The automatic character of textile machinery insures a comparatively large floor space per operative in any room. Any tendency to jam more machinery into a room as machinery becomes more efficient is checked by the discovery that space for operatives about machinery and good light may give an equal production of cloth with less machinery. Even in the older mills of the average type the ceiling is sufficiently high so that with the floor space required for machinery a liberal initial cubic air space per capita of employees is practically assured. If ventilation, therefore, were a mere matter of the removal of second-hand air, with its practically inevitable supply of pathogenic organisms, and the furnishing of fresh air to human beings, the ventilation of cotton mills would be a simple proposition.

A fairly high percentage of relative humidity evenly distributed through a room is, however, absolutely essential to the conduct of the industry. In the climate of Massachusetts for a large part of the time the outside air will not supply this requisite percentage of moisture for temperature demanded for the comfort of indoor workers, and the necessary humidity, therefore, has to be maintained artificially. Whenever human beings are given a chance to do so with artificial means of heating they may always be counted on to let the temperature run up to an excessive degree. In cotton mills, also, there is a large amount of heat generated by the friction of the manufacturing processes. In one mill in which conditions seemed to make estimates of heat from this source possible it appeared that the temperature of a spinning room was run up 10 or 15 degrees in the first hour after the machinery was started from this cause alone. While a certain amount of moisture varying somewhat in the different manufacturing operations is necessary, excessive moisture is, on the other hand, bad. With either a deficiency or excess of moisture yarns begin to break. With a high temperature a liberal supply of watery vapor can be assured, and maintenance of a high temperature prevents the likelihood of saturation, so naturally there have arisen among mill overseers and operatives whims, notions and prejudices as to what temperatures are necessary to make their work proceed satisfactorily.

All the factors above referred to cause a tendency toward unnecessarily high temperatures and high relative humidity in cotton mills, and a reluctance to admit outside air unless these matters be automatically controlled. In some of the newer mills this control is carried to the extent of having all air supply for a mill washed, heated in winter or cooled in summer, and delivered properly moistened to the various rooms. The cost of an efficient system of this sort is very great, but in one instance in which information on the subject was available it would appear that the increased production of cloth per spindle for the mill made the cost of installation of the system a paying investment. A system as elaborate as the one just referred to is, however, impracticable except for new construction, and in the older mills the attention of some one in authority may be called to the atmospheric condition of a room when he sees "the help getting logy."

This matter of temperature and humidity in Massachusetts industries is made the subject of the following statutory law: —

### CHAPTER 543, SECTIONS 1-4, ACTS OF 1910.

SECTION 1. In every weaving and spinning department in a textile factory wherein water is introduced for humidifying purposes there shall be provided, maintained and kept in correct working order, for the purpose of recording and regulating the humidity of the atmosphere and the temperature, at least one set of standardized wet and dry bulb thermometers, and, if required by [an inspector of the state board of labor and industries], two sets of such thermometers, and the following regulations shall be observed in the use of the thermometers: (*a*) The thermometers shall be placed as directed or sanctioned by [an inspector of the state board of labor and industries], and shall be plainly visible to the workers. (*b*) The occupier or manager or person for the time being in charge of the weaving or spinning department in question shall read the thermometers thrice in the day, namely, between seven and eight o'clock in the forenoon, between ten and eleven o'clock in the forenoon and between three and four o'clock, except in rooms which are lighted by gas, and then between four and five o'clock, in the afternoon of every day on which any persons are employed in any weaving or spinning department, and he shall record the readings of each thermometer in such department at each of the said times upon a form provided for the purpose, which, together with the regulations relating thereto, shall be furnished by the state board of [labor and industries]. The records of the readings shall not be destroyed until they have first been seen by [an inspector of the state board of labor and industries] in whose district the factory is situated, and then not without his knowledge and consent.

SECTION 2. Section one shall not apply to textile factories already equipped with, or which become equipped with, such a number and type of standardized self-registering hygrometers, or psychrometers, or hygrometric system, as meet the approval of the state board of [labor and industries], provided that the manner of using the same is approved by [an inspector of the state board of labor and industries] in whose district the factory is situated, and provided that the records of the readings from the said hygrometers, or hygrometric system installed, are not destroyed without the knowledge and consent of said inspector.

SECTION 3. Section one shall not apply to textile factories the occupier or manager or person in charge of which makes use of the sling hygrometer with the express purpose of quickly and accurately determining the actual moisture and temperature of a weaving or spinning department as frequently and in such a manner as is approved by [an inspector of the state board of labor and industries] in whose district the factory is situated, and provided that the records of the readings from the use of the said hygrometer are not destroyed without the knowledge and permission of said inspector.

SECTION 4. No owner, occupier or manager or person for the time being in charge of a textile factory shall permit the relative humidity in a weaving or spinning department in the textile factory under his control to exceed the following limits:

| I. | II. | III. | I. | II. | III. |
|---|---|---|---|---|---|
| Dry Bulb Thermometer Readings. Degrees Fahr. | Wet Bulb Thermometer Readings. Degrees Fahr. | Percentage of Humidity. | Dry Bulb Thermometer Readings. Degrees Fahr. | Wet Bulb Thermometer Readings. Degrees Fahr. | Percentage of Humidity. |
| 60 | 58 | 88 | 78 | 73.5 | 77 |
| 61 | 59 | 88 | 79 | 74.5 | 77.5 |
| 62 | 60 | 88 | 80 | 75.5 | 77.5 |
| 63 | 61 | 88 | 81 | 76 | 76 |
| 64 | 62 | 88 | 82 | 76.5 | 74 |
| 65 | 63 | 88 | 83 | 77.5 | 74 |
| 66 | 64 | 88 | 84 | 78 | 72 |
| 67 | 65 | 88 | 85 | 79 | 72 |
| 68 | 66 | 88 | 86 | 80 | 72 |
| 69 | 67 | 88 | 87 | 80.5 | 71 |
| 70 | 68 | 88 | 88 | 81.5 | 71 |
| 71 | 68.5 | 85.5 | 89 | 82.5 | 71 |
| 72 | 69 | 84 | 90 | 83 | 69 |
| 73 | 70 | 84 | 91 | 83.5 | 68 |
| 74 | 70.5 | 81.5 | 92 | 84.5 | 68 |
| 75 | 71.5 | 81.5 | 93 | 85.5 | 68 |
| 76 | 72 | 79 | 94 | 86 | 66 |
| 77 | 73 | 79 | 95 | 87 | 66 |

There are, of course, many times during the warmer months of the year in Massachusetts particularly, especially on the southern coast, when both the temperature and humidity of the outside air exceed the limits thus set by the State law even though there be no precipitation. While no effort was made in this investigation to compile careful data on the subject, it seemed probable that most of the boys examined in the autumn and early winter on clear dry days were working in a mill temperature of about 75° F., with a relative humidity not over 70 per cent. As has already been stated, the work which the boys were found doing did not involve much physical exertion, and, moreover, it was usually intermittent in character. These facts are, of course, material in considering the possibilities of temperature and relative humidity in interfering with the elimination of bodily heat. An effort was made to learn from more intelligent boys if they lost weight after beginning to work in the factories, but except in a few instances their testimony was negative, as well as was all other evidence coming within the scope of this investigation so far as the effect of temperature and humidity were concerned. The subject, however, appears to deserve more careful study than those engaged in this investigation were authorized to give it.

## RECOMMENDATIONS.

Although this investigation did not happen to disclose any instances of the employment of minors engaged in work obviously injurious to health it was, nevertheless, apparent that such instances are likely to occur. It was also apparent that injury to health may occur from some change in the duties contemplated when the employment certificate was issued. It was apparent from the physical examinations alone that there were boys whose interests from the point of view of physical welfare called for further attention after being permitted to go to work, whatever the work for which an employment certificate might be issued. Such attention to serve any useful purpose must be given with view to the needs of individual cases. It was also apparent that the economic possibilities of many of these boys, and the interests of the State as well, would be better subserved if they could be given more education than they had received. While it does not appear from this report, it was learned that the great danger at present of issuing employment certificates improperly arises from the fact that those authorized to make the physical examinations are at times so overwhelmed by applicants that individual cases cannot be given the attention they may deserve. Moreover, no physician whose duties do not bring him in actual touch with the occupations concerned can intelligently judge in many instances of the physical fitness of a minor to engage in the occupation. For the reasons above stated it is recommended that the authority to issue a working certificate to a minor be vested exclusively in some central State agency, a part of whose functions it is to know actual working conditions in any occupation in the State, such certificate to be issued on a formal prescribed application calling for any information deemed desirable regarding the applicant and including the approval of the local school committee and evidence satisfactory to such central State authority of physical fitness as shown by a detailed report on a prescribed form of a physical examination of the applicant. Instead of having an employment certificate practically irrevocable as at present, and attempting to safeguard certificates by care in the selection of a few authorized examining physicians, it is recommended that the central State authority may, if it deem advisable itself, and shall as a matter of course on request of the local school committee, limit the life of a certificate and make its reissue dependent on the reapproval of the local school committee and another physical examination. It is also recommended that the central State authority may accept a report on the prescribed form of physical examination of an applicant from any registered physician in the State, approved by the local school authorities, but that the central State authority shall have power to require that a report as to the physical condition of a minor applicant or a minor at work be furnished in any case or at any time by a medical officer in the employ of the State.

It is believed that changes in the present law to the effect just indicated would result in insuring a much better and highly desirable control over the educational interests and physical welfare of minor wage earners in the State.

Except in the directions above indicated it is not believed that this investigation has disclosed the need of any new industrial legislation. This investigation has, of course, been very narrow in its scope, but so far as it has gone the matters shown to be deserving of greater attention are rather matters awaiting the slow building up of an effective organization for carrying out already existing provisions of law. The remedy, or better, the prevention, of the defective physical conditions disclosed by the actual physical examinations of the boys is a civic rather than an industrial problem. To a certain extent there is the hard problem involved of helping mental defectives to make the most of themselves. The defective physical conditions found are to some extent the results of bad heredity and disease accidents in early life, but to a greater extent they reflect ignorance and neglect. In this report reference to any specific locality or to any particular mill has been purposely avoided, but from data available it is possible to show that in some localities visited there is a civic spirit which has led to better care of the physical well-being of the population than in others. It takes money to preserve the health of any community, but without individual education of the proper character money spent for health purposes is largely wasted.

In the Philippines adults in the homes were educated in sanitation through instruction of children in the schools. Not only do the schools of Massachusetts offer the same opportunity to educate parents indirectly in child welfare, but the medical supervision of school children contemplated in existing statutory law of the Commonwealth offers the means of preventing directly much of the evidence of child neglect appearing in Table No. 17.

Respectfully,

M. VICTOR SAFFORD,
*Assistant Surgeon, United States Public Health Service.*

## Form used in making Examinations.

STATE OF MASSACHUSETTS. BOARD OF LABOR AND INDUSTRIES.

No.......... Minor's examination. Date...............19

Cert. No......... Name.......................... General occupation.............

(N.B. Read instructions before beginning examination.)

……

(A) Age...... Nativity........ Race........
Address....................................
Present work temporary, permanent, intermittent.

Remarks:

Room....... Hours of work..........
Special work.........................
When and where previously employed...
...................................
Piecework......... Standing........
Posture........... Sleeping.........

……

### (B) *Physical Examination.*

Cross out abnormalities not present.

……

Height.........................without shoes.
Weight.........................without clothes.
Dynamometer right hand..........lbs. Left hand..........lbs. Traction...............lbs.
Physical development poor, fair, good, robust.
Physically undeveloped for age claimed...........

General appearance, emaciated, healthy, anæmic.
Mouth breather; stutters; poor articulation. Face twitches; choreiform movements; has cough.
Vaccinated within five years...........

Remarks:

……

### (C) *Eyes.*

Cross out conditions which can be excluded. If in doubt make(?).

……

(N.B. Put the following in agate type)
What is the longest and shortest distance from the eye at which the minor can read this type? Longest......in.
Shortest......in.
Vision for distance (Snellen's type)
Right eye......Left eye......

Congestion.
Conjunctivitis, acute.
Conjunctivitis, chronic.
Conjunctivitis, fol.
Trachoma.
Blepharitis.
Myopia.

Ptosis.
Cataract.
Keratitis.
Strabismus.
Nystagmus.
Astygmatism.

Unequal pupils.
Phlyctenular ulcer.
Corneal opacities.
Color blindness.
Hypermetropia.

Specify nature and extent of refractive errors. Are refractive errors corrected by glasses?
Additional abnormalities and remarks:

……

### (D) *Ears.*

……

Hears ticking of watch right ear...............in.
left ear...............in.
Hearing dull, normal.
Additional abnormalities and remarks:

Excessive cerumen.
Perforated drums.
Furunculosis.

Otorrhœa, chronic.
Otorrhœa, acute.
Polypi.

……

### (E) *Nose, Mouth, etc.*

……

Unable to breathe through right or left nostril.

Rhinitis.
Polypi.
Spurs.

Deflected septum.
Chronic catarrh.

Pharyngitis.
Laryngitis.
Adenoids.

Deformed palate.

Tonsils enlarged: —
Slightly.
Moderately.
Greatly.

Mucuous membrane mouth indicates anæmia?. . . .........Unclean teeth.
Lead line on gums.

Tongue.
Slightly coated
Badly coated.
Fissured.
Scarred.
Red.

(M, missing; D, decayed; F, filled; A, artificial; O, out of position; H, Hutchinson; R, rachetic.)

Upper jaw. Lower jaw.

Additional abnormalities and remarks:

……

(F) *Respiratory and Circulatory Systems.*

..........................................................................................

Chest measure, expiration................in.
inspiration..............in.
Fine rales. Consolidation. Cavity.
Coarse rales. Unequal expansion.
Pleuritic rubs. Old empyema.
Describe deformities.
State diagnosis.
Is sputum examination deemed advisable?

Heart:
Irregular.
Abnormally rapid.
Intermittent.
Abnormally slow,
irritable.

Apex beat displaced.
Downward.
Right.
Left.

Murmur heard loudest at..................
Murmur transmitted to back..............
State diagnosis.

Additional abnormalities and remarks:

..........................................................................................

(G) *Skin, Appendages and Lymphatic System.*

..........................................................................................

Enlarged glands:
Occipital.
Cervical.
Axillary.
Epitrochlear.
Goiter.

Scalp:
Pediculosis.
Favus.
Ringworm.
Eczema.
Seborrhœa.

Body:
Pediculosis.
Ringworm.
Eczema.
Impetigo.
Furunculosis.
Acne.
Psoriasis.
Paronychia.
Favus, finger nails.
Dermatitis, hands.

If other abnormal skin or gland condition or occupational dermatitis, describe it.

..........................................................................................

(H) *Bony and Muscular Systems.*

..........................................................................................

Active tuberculosis:
Spine.
Hip joint.
Knee.

Round shoulders.
Kyphosis.
Scoliosis.
Lordosis.

Knock knees.
Bow legs.
Flat feet.
Rachetic deformities.

Admits having
hernia, varicose veins.

Malformation; mutilation, hands or limbs; anchylosis or lameness. Describe character and extent of disability.

..........................................................................................

(I) *Abdominal Organs and Indications of General Diseases.*

..........................................................................................

Abdomen:
Epigastric tenderness.
Abdominal tenderness.
Protuberent abdomen.
Temperature by clinical thermometer
(If indicated)....................

Minor suspected to have:
Appendicitis.
Gastric ulcer.
Lead colic.
Lead or chemical poisoning.
Intestinal parasites.
Nephritis.
Diabetes.
Malaria.

Blood, urine, Wassermann examination recommended.

REMARKS:

..........................................................................................

(K) *Nervous System.*

..........................................................................................

Choreiform movements, tics, paralysis, describe. Test for anæsthesia and abnormal reflexes if suspected.

REMARKS:

..........................................................................................

(L) *Mental Capacity.*

..........................................................................................

School education.........................
Illiterate.........................
Is mental defectiveness suspected?...........

REMARKS:

..........................................................................................

### (M) *Laboratory Examinations.*

................................................................................

Examination of sputum........................ Wassermann reaction.................
Urine sp. gr............. Albumen.................... Sugar.....................
Lead............. (Test for lead if exposed to lead poisoning.)
Blood HMG............ Red count................... White count................
Differential : Neutro...............: Lympho............: Transit............
Large mononuclear.........................: Eosinophiles.......

................................................................................

### (N) *Previous Condition of Health and Remarks regarding Same.*

................................................................................

Has had Scarlet fever. Whooping cough. Tuberculosis. Measles.
Typhoid fever. Fainting spells. Diphtheria. Epilepsy.
Rheumatic fever.
Is subject to Headaches.......frontal, occipital, hemicranial.
Indigestion......chills, uses tobacco.

What accidental injuries?

................................................................................

### (O) *Home Conditions.*

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### (P) *Additional Information, Remarks and Recommendations.*

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# APPENDIX G.

## SUPREME JUDICIAL COURT DECISIONS.

### Decision — Employment of Aliens.

### Lee *et al.* *v.* City of Lynn *et al.*

Essex. March 2, 1916.

*Public Labor — Employment of Aliens — Statutes giving Preference to Citizens.*

Petition by taxpayers of Lynn to enjoin the discharge of alien laborers and prevent public officials from giving preference to citizens in employing mechanics and laborers on public works. In the Superior Court, McLaughlin, J., sustained a demurrer filed by defendants and reported the case to the Supreme Judicial Court.

J. E. Macy and J. C. Moloney, for petitioners.

E. F. Wallace, for respondents.

Rugg, C.J. The constitutionality of St. 1914, c. 600, and St. 1909, c. 514, § 21, as amended by St. 1914, c. 474, is assailed in this suit as contravening the rights secured both by the Fourteenth Amendment to the Federal Constitution and by Part I., Art. 12 of the State Constitution.

In substance, these acts require that "in the employment of mechanics and laborers in the construction of public works by the commonwealth, any county, city or town, or by persons contracting therewith, preference shall be given to citizens of the commonwealth;" and that, "in all work of any branch of the service of the commonwealth, or of any city or town," a like preference shall be given.

Since the argument of the case at bar, the Federal questions involved have been decided adversely to the contentions of the plaintiff. (Heim *v.* McCall, 239 U. S. 175; Crane *v.* New York, 239 U. S. 195, affirming People *v.* Crane, 214 N. Y. 154; Elkan *v.* Maryland, 239 U. S. 634.) By these decisions statutes of other States, indistinguishable so far as concerns their constitutionality in any material particular from those here attacked, have been upheld as not violative of any right protected by the Federal Constitution or secured by treaty of the United States with Italy and by other treaties containing "the Most Favored

Nation Clause." On the authority of these cases it must be held without further discussion that the instant statutes are not inconsistent with the Federal Constitution and treaties.

While the provisions of our Constitution are not in the same words as those of the United States Constitution upon this subject, the result must be reached that these statutes are not in conflict with the State Constitution. The decision upon this point is concluded in principle by Woods *v.* Woburn, 220 Mass. 416, following the reasoning and conclusion set forth in Opinion of Justices, 208 Mass. 619, where the power of the Legislature was upheld to fix the number of hours which shall constitute a day's labor for employees of the Commonwealth and its governmental subdivisions, and by the reasoning of the decisions of the United States Supreme Court just cited. The cities and towns of the Commonwealth are divisions of government established in the public interests. The Legislature is supreme in the control of these governmental instrumentalities, subject to the provisions of the constitution. In its representative capacity, within appropriate functions of legislation, the General Court stands in the position of employer. It may establish general rules for the employment of labor. Since it is a public agency directing the expenditure of money raised by taxation, it cannot make arbitrary discrimination and favor the employment of one class of citizens to the exclusion of others. But a preference of citizens over aliens in the public service is not favoritism among the subjects of the Commonwealth. Aliens are not members of the State in the strict sense. Statutory discriminations in favor of citizens and against aliens have been upheld. In Commonwealth *v.* Hilton, 174 Mass. 29, regulations restricting to inhabitants the right to take clams were sustained, and in Commonwealth *v.* Hana, 195 Mass. 262, a requirement that licenses to pedlers should be granted only to those who had declared an intention to become citizens was held to be valid. Where the State, either directly or through its governmental departments, acts as proprietor or employer, a determination not to engage aliens in its service cannot be pronounced unreasonable or violative of any constitutional mandate.

The distinction between laws passed by the Legislature regulating the conduct of the State and its departments and subdivisions as employer, which are within its right, and similar laws designed to control the conduct of the general public, is adverted to in Truax *v.* Raich, 239 U. S. 33. A law of the latter class there was held to fall under the condemnation of the fundamental law. But the present statutes belong plainly to the former class.

It cannot be said that these statutes are void for indefiniteness or vagueness. Preference to citizens over aliens in employment in its ordinary sense means that, where other considerations are equal, the opportunity for employment shall go to the citizens. The provisions of St. 1914, c. 600, §§ 2, 3 and 4, in relation to the civil service, appear to be too plain to require general discussion. "Public works," as used in St. 1914, c. 474, are not words so uncertain in significance as to affect the validity of the statute. Doubtless in the ordinary case there would be little difficulty in determining their meaning. Manifestly, in this connection water works are public works. (See Milford Water Co. *v.* Hopkinton, 192 Mass. 491.)

There is no force in the contention that St. 1914, c. 600, applies only to cities and towns where the classified civil service prevails under the civil service law. Section 1 of the act is not thus constricted by subsequent sections.

It is not necessary to determine whether the present statutes are so retroactive as to require the discharge of faithful and efficient aliens in service at the time of its enactment, or whether they relate only to the future (see Hanscom *v.* Malden & Melrose Gas Light Co., 220 Mass. 1), for the plaintiffs on the allegations of the bill do not show themselves entitled to relief. (Steele *v.* Municipal Signal Co., 160 Mass. 36; Sylvester *v.* Webb, 179 Mass. 236, 241.)

*Petition dismissed without costs.*

## DECISION — HOURS OF LABOR FOR WOMEN.

## COMMONWEALTH *v.* JOHN T. CONNOR CO. CORP.

SUFFOLK. Nov. 30, 1915.

*Labor and Labor Laws — Woman employed more than Ten Hours per Day as Cashier in Grocery Store — Character of Work warrants Finding that Woman was "employed in laboring" within Meaning of Statute 1913, c. 758 — Statutes limiting Hours of Labor of Women, Constitutional.*

RUGG, C.J. The defendant is charged with having employed Elsie Finn in laboring more than ten hours in one day and more than fifty-four hours in the week, in violation of St. 1913, c. 758. The pertinent words of that statute are: "No . . . woman shall be employed in laboring in any factory or workshop, or in any manufacturing, mercantile, mechanical establishment, telegraph office or telephone exchange, or by any express or transportation company, more than ten hours in any one day; and in no case shall the hours of labor exceed fifty-four in a week," with exceptions not here material.

There was evidence tending to show that the defendant employed Elsie Finn as cashier in its grocery store, admittedly "a mercantile establishment," a greater number of hours than stated in the statute. Her work consisted of making change during all the day to customers, who presented to her slips received from the salesmen, together with the money in payment for the goods purchased as shown on the slip. She was confined in an enclosure during working hours, just about large enough for two persons to sit in, called a "cage." She was kept busy all the time. She did incidentally a trifling amount of bookkeeping in connection with the slips handed her. She also gave trading stamps to customers. The question to be decided is whether this evidence warranted a finding that she was "employed in laboring" within the meaning of these words in the statute.

The constitutionality of statutes limiting the hours of labor of women has been upheld, commonly on the ground that woman is under an industrial disability by reason of sex, that her physical structure and the duty of maternity place her at a disadvantage, and that her strength and vitality are likely to be impaired by confining and exacting labor under adverse conditions, and that thus the public welfare is injured by affecting deleteriously the vigor of mothers and through them the virility of the race. (Com. *v.* Hamilton Mfg. Co., 120 Mass. 383, decided in 1876; Com. *v.* Riley, 210 Mass. 387; Muller *v.* Oregon, 208 U. S. 412, 421.) This reasoning applies quite as strongly where the labor is not purely physical but is also mental. The words "labor" or "laboring" have no hard and fast meaning. They are of comprehensive scope, and may be equally descriptive of that done by those who toil exclusively with their brains, as well as by those who perform the roughest and least intellectual kind of manual work. (Mitchell *v.* Packard, 168 Mass. 467.) The point is to ascertain the meaning of the Legislature when it used the words of this statute. They first occur in St. 1842, c. 60, § 3, which enacted that "No child under the age of twelve years shall be employed in laboring in any manufacturing establishment more than ten hours in any one day." If attention be fixed solely on the history of these words in all the intervening statutes, there is much strength in the contention urged in behalf of the defendant, that the words "in laboring" so qualify the word "employed" as to exclude from the operation of the statute all those who are not engaged in work demanding physical effort, muscular strength and manual exertion. But the changes in the statute wrought by the additions made in the revision of the section in 1913 are significant of a relaxation of the limiting force of the words "in laboring." There then was included for the first time within the inhibition of the statute women employed in telegraph offices and telephone exchanges and by express and transportation companies. The character of the work of women as telegraphers or telephone operators is well known. It involves intellectual alertness rather than manual labor, although in a certain sense both are combined. It does not differ in its essential character from that performed by Elsie Finn for the defendant. The degree of weariness and confinement is as great in her case as in theirs. The evil at which the statute appears to be aimed is as imminent in the one case as in the others. Applying to the interpretation of this statute as now phrased the established canon of statutory construction that the scope of doubtful words may be ascertained by reference to the operation of other associated words, it seems to follow that a woman engaged in the work performed by Elsie Finn for the defendant is as much "employed in laboring" as is a telegrapher or an operator in a telephone exchange.

We reach the conclusion for the reasons stated, notwithstanding the numerous statutes of other States, where generally the prohibition is against the employment of women under the forbidden conditions without limiting words resembling "in laboring" found in our statute.

It is not necessary to define explicitly the words of our statute or to determine whether they can be stretched to include bookkeepers, stenographers and those engaged in kindred service, or to say that the statute means the same as if the words "in laboring" had been omitted. As to those engaged in these and similar pursuits, the statute is not plain, and difficulties may arise in its further application. But we are of opinion that the case at bar rightly was submitted to the jury. There was no error in denying the defendant's requests for instructions. The first two were not sound in law, and the third was not applicable to the evidence.

*Exceptions overruled.*

A. C. Webber, Assistant District Attorney, for Commonwealth.
J. J. Foley, for defendant.